

EXHIBIT A – SCOPE OF SERVICES

April 3, 2024

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Subject: Contract No.: CW2262296
PWR-09107 Cowlitz Trout Hatchery Remodel Program
Re: Scope of Work, V8

Ms. Zukowski

McMillen, Inc. (McMillen) appreciates the opportunity to work with Tacoma Power (TPU) on the Cowlitz Trout Hatchery Remodel Program (Program). The program includes five phases associated with planning and development of the facility remodel. The five phases include: 1) Planning – Phase sequencing; site identification; staffing strategies; agency negotiation and conceptual design; 2) Design and Permitting; 3) Go/No Go for construction and final decisions on Phasing; 4) Construction; 5) Commissioning. The multi-phased project is anticipated to span 7-8 years. We have developed the following detailed scope of work (SOW) and budget for your review and negotiation for Phase 1 of the Program.

PROGRAM UNDERSTANDING

The Cowlitz Project (FERC No. 2016) is TPU's largest electrical generating facility and is located on the Cowlitz River in Lewis County, Washington. The Project consists of two dams, Mayfield Dam at river mile (RM) 52 and Mossyrock Dam, upstream at RM 65. In addition to generating electricity and providing flood control, Tacoma operates three major parks, manages approximately 14,000 acres of wildlife lands, owns and funds operation of the Cowlitz Salmon Hatchery (RM 50) and the Cowlitz Trout Hatchery (RM 42), and operates a large fish passage program around the dams on the Cowlitz River.

The original license for the Cowlitz Hydro Project included the requirement for two large hatcheries to be constructed and operated on the lower Cowlitz River by TPU. The Cowlitz

Salmon Hatchery began operation in 1967, and six miles downstream the Cowlitz Trout Hatchery began operation in 1968. TPU has funded and operated these hatcheries continuously since they began operation.

The Cowlitz Hydro Project license was renewed for a period of 35 years on July 18, 2003, by the Federal Energy Regulatory Commission (FERC). TPU continues to be obligated to implement FERC license orders in an adaptive manner to protect, mitigate, and enhance the natural resources of the Cowlitz River system for the term of the new license. The Cowlitz Salmon Hatchery was substantially remodeled in 2007-2010. The Cowlitz Trout Hatchery has never undergone a remodel. This project will allow TPU to review currently needed operational and physical changes and improvements at the Cowlitz Trout Hatchery. The Cowlitz Hatchery Complex Remodel and Phase-in Plan (HCRPP) was approved by FERC for the Cowlitz Salmon and Cowlitz Trout hatcheries in 2006 and included upgrades to the Cowlitz Trout Hatchery. Some projects were completed at the Trout Hatchery; however, most of the remodel activities occurred at the Salmon Hatchery. Since that time, additional items at the Trout Hatchery have been identified as needing upgrades.

In 2017 a Bioprogramming Report was completed, and in 2018 the Cowlitz Master Plan was completed, and additionally TPU completed work on the existing Ozone Plant in 2020/21.

PROGRAM GENERAL ASSUMPTIONS

Based on the information provided by TPU and our Program Understanding as identified above, the following assumptions have been made in the development of this Scope of Work. These assumptions impact the overall Program and budget. However, McMillen will gladly entertain any discussion on these assumptions to ensure they align with the TPU's goals.

- All virtual meetings will take place using Microsoft Teams.
- McMillen's policy is to purchase refundable airfare to protect our clients and our team in case meetings need to be rescheduled.
- Geotechnical investigation for design of structures on the Hatchery site are not required for Phase 1 of the Program. However, shallow borings will be required to determine the stormwater infiltration ability of the soils at the Hatchery site. General conservative assumptions will be developed and identified. Any historical information available from the existing hatchery design and construction will be referenced during Phase 1.
- For all contract current fiscal years, General Services Administration (GSA) will be per the current per diem rates for travel to Tacoma, WA , the Project Site Trout Hatchery located in Toledo, WA, and meeting conference room at Salmon Hatchery in Salkum, WA: for per person for lodging; mileage, meal, and incidental expenses (M&IE): per person per full day

(first/last day travel). GSA Privately owned vehicle (POV) mileage reimbursement rates will be used based on the fiscal year in which the mileage is reimbursed. (Please see McMillen Expense Rate Schedule as part of this Contract)

- Assumes notice to proceed (NTP) occurs on May 28, 2024, and Phase 1 will take two calendar years to complete. McMillen assumes the project NTP to be granted within three months of estimated NTP. If the award process is prolonged, the Project's total budget will need to be reassessed for potential adjustments due to the delay.
- Travel is dependent upon weather and biological conditions, such as a pandemic (e.g., Covid-19).
- TPU review periods will be 10 business days unless noted otherwise.
- TPU will have one-month advance notice of meetings to adequately schedule their team.
- TPU will approve the number of McMillen and TPU attendees at workshops and meetings during advanced review of all agendas.
- The attached schedule is the anticipated period of performance for the identified tasks.
- TPU CADD standards will be utilized for Civil 3D CADD and AutoCAD MEP format for the drawings.
- Specifications will not be developed in Phase 1.
- The total duration of the project is anticipated to be 24 months.
- Topographic Survey completed to date will be provided by TPU.

PROJECT APPROACH

The TPU outlined the Scope of Services and Deliverables for completing Phase 1 of Project that includes project management, new and updated reports, new models, survey coordination, alternative analysis, permitting support, and 10% design. The proposed SOW provided below generally follows the Request for Proposal (RFP) Project Scope but is organized to streamline the Project and to meet the anticipated deliverables outlined in the Scope of Services and Deliverables.

McMillen's Program approach is identified in the following tasks and activities. The Tasks will be completed in the order described, excluding Project Management, which is included for the duration of the Project.

- Task 1: Program Management
- Task 2: TPU Partnering Charter/Kick Off

- Task 3: Data Collection
- Task 4: Environmental
- Task 5: Survey Coordination – TPU Survey Services
- Task 6: Basis of Design Memorandum
- Task 7: Update Bioprogramming Report & Model
- Task 8: Ozone Treatment Facility Study
- Task 9: Groundwater Rehabilitation Study
- Task 10: Climate Change Study
- Task 11: Water Rights Analysis
- Task 12: Water Supply Alternatives Analysis
- Task 13: Hatchery Facility Alternatives Analysis
- Task 14: Hydrology/Hydraulic Analysis
- Task 15: 10% Design Plan Set and Basis of Design Memorandum
- Task 16: Full Opinion of Probable Construction Costs 10% Design

The work tasks are organized to identify and develop a preferred alternative for the Project that will be implemented into 10% design plans. Ultimately the work tasks will address the goals and requirements of the Project. The following narrative provides McMillen’s program approach and assumptions for each work task.

TASK 1: PROGRAM MANAGEMENT

SUBTASK 1.1 INITIAL CONTRACTING, INVOICING, & PROGRESS REPORTS

Project management will be conducted throughout the Program and will include accounting setup and monthly invoicing, staff scheduling, and overall project coordination with the Program team and subconsultants. Jodi Burns, PE, will be the Project Manager (PM) for the Program and the primary point of contact. She will monitor and maintain the Program budget, schedule, and lead meetings, and coordinate all review periods for project deliverables.

Clear and concise communication is imperative to conducting a smooth and efficient project delivery. Throughout the Program life, we will continue to maintain a strong, integrated team that includes key individuals from TPU and other TPU-identified individuals from participating agencies, along with the McMillen evaluation team. This core team will provide valuable input and criteria and production programs to guide the Program to successful completion. Close

communication within this team will provide the foundation for the successful evaluation of the Cowlitz Trout Hatchery.

DELIVERABLES

- Monthly Invoices (PDF format)
- Monthly Progress Reports with Earned Value Report (PDF format)

ASSUMPTIONS

- Monthly invoices shall include task number and name, position, hourly rate, employee, hours, and approved expenses.
- Progress reports will be submitted to the TPU Program Manager two days prior to invoice submittal for review and approval.
- TPU has two days to complete their review and approval of progress reports.
- The Program is assumed to be completed in 24 months. Therefore, there will be 24 invoices and progress reports delivered for this Program.

SUBTASK 1.2 QA/QC PLAN

All documents will be reviewed internally, and comments will be incorporated before submitting to TPU. Review by the QA/QC team will be required for all technical documents such as detailed reports, technical memorandums, drawings, and construction cost estimates. As part of the overall quality control process, our Project Manager will identify those team members who are qualified and available to complete reviews of each of the identified deliverables.

Comments on these deliverables will be provided to Derek Nelsen, our QA/QC lead, on our QA/QC Comment/Response Form. Derek Nelsen and Jodi Burns will compile all the comments and provide them to the design team, and they will review and add their responses to the same form. The QA/QC team will review the responses. All comments/responses will be reconciled within the internal team before submission to TPU. Once the modifications have been made, Derek Nelsen will review the deliverable documents to ensure that all comments have been incorporated. Derek Nelsen will then complete the Comment/Response Form, documenting the quality control process.

DELIVERABLES

- DRAFT QA/QC Plan (Word and PDF format)
- FINAL QA/QC Plan (Word and PDF format)

ASSUMPTIONS

- The QAQC plan will be provided as an appendix to the Program Management Plan (PMP) (Subtask 1.7).
- TPU review periods will be 10 business days unless noted otherwise.

SUBTASK 1.3 COMMUNICATION MANAGEMENT PLAN

Establishing a clear and effective communication protocol at Program initiation is important to ensure that information is collected, distributed, and accurately documented. The protocol presented within the Communication Management Plan will outline the proper communication with TPU, external agencies and groups (as required by TPU), and between the internal team members. McMillen has organized our Program team and structure to efficiently manage and execute the Program. Specific contact information for each key team member will be presented in the Communications Management Plan to ensure clear and concise communication throughout the Program duration.

The Communication Management Plan will set the communication framework for the Program and will serve as the guide for communications throughout the Program. The plan will identify and define the roles of the team members as it pertains to communications. Information provided in the communications plan include the following:

- Key Points of Contact,
- Decision/Conflict/Dispute Resolution Plan and Matrix,
- Communication Matrix,
- Role and Responsibilities Matrix, and
- Responsible, Accountable, Consulted, and Informed (RACI) Matrix.

DELIVERABLES

- DRAFT Communication Management Plan (Word and PDF format).
- FINAL Communication Management Plan (Word and PDF format).
- DRAFT Decision/Conflict/Dispute Resolution Plan and Matrix (Excel and PDF format.)
- FINAL Decision/Conflict/Dispute Resolution Plan and Matrix (Excel and PDF format.)
- DRAFT Roles & Responsibilities Matrix (Excel and PDF format)
- FINAL Roles & Responsibilities Matrix (Excel and PDF format)

- DRAFT Communications Matrix (Excel and PDF format).
- FINAL Communications Matrix (Excel and PDF format).
- DRAFT RACI Matrix (Excel and PDF format).
- DRAFT RACI Matrix (Excel and PDF format).

ASSUMPTIONS

- The Communications Management Plan and matrices will be provided as an appendix to the PMP (Subtask 1.7).
- TPU review periods will be 10 business days, unless noted otherwise.
- McMillen will use example RACI from TPU PMP as a template for the Program.

SUBTASK 1.4 MONTHLY MASTER PROGRAM SCHEDULE

The PM will develop and maintain the program schedule. As a starting point, the preliminary schedule developed for this proposal will be used. To ensure McMillen adheres to the schedule, the PM will lead internal and external program meetings. Monthly updates to the schedule will be completed by McMillen and submitted to TPU for review and approval.

The schedule presents each of the major work tasks within the McMillen work scope and the associated timeline anticipated for completion. The engineering schedule provides critical links between specific work tasks clearly indicating the required sequential execution of the Program.

DELIVERABLES

- Monthly Updates to Program Schedule (Microsoft Project and PDF format)

ASSUMPTIONS

- TPU review periods will be 10 business days, unless noted otherwise.
- Monthly Program Schedule updates will be provided to TPU two weeks prior to every Fisheries Technical Committee (FTC) meeting scheduled. TPU will provide when the meeting is scheduled for coordination.
- Program Schedule updates will be provided to TPU one week prior to the regularly scheduled Program Schedule and Risk Register Meeting (see, Subtask 1.8).
- The Program schedule will outline the decision points for the Program, all tasks and subtasks, and all deliverables.
- The most likely and highest impact risk items will be added to the schedule.
- McMillen will add and manage the TPU resources within the overall Program schedule.

- The Program Schedule will be provided as an appendix to the PMP (Subtask 1.7).
- For the purposes of budgeting, it is assumed a full-time employee from McMillen is for two (2) years will be needed for this effort which will be tracked and or reduced if less level of effort is needed.

SUBTASK 1.5 RISK REGISTER

The approach for managing risks for the Program includes a process by which the team identifies score and ranks various risks. Every effort will be made to proactively identify risks ahead of time to implement a mitigation strategy. The most likely and highest impact risks will be added to the Program Schedule (Subtask 1.4) to ensure that the team takes the necessary steps to implement the mitigation response at the appropriate time during the schedule.

A risk register of possible factors that could change the course of the design, construction, and would impact cost, schedule, or both, will be developed by the PM and will be included in the PMP. The risk register will be updated throughout the duration of the design process.

DELIVERABLES

- Monthly Risk Register Updates (Excel and PDF format)

ASSUMPTIONS

- TPU review periods will be 10 business days, unless noted otherwise.
- The Risk Register will be provided as an appendix to the PMP (Subtask 1.7).
- Task assumes 4 hours per month to update the Risk Register through Phase 1.

SUBTASK 1.6 CHANGE MANAGEMENT PLAN

McMillen will prepare a change management plan that defines the process for managing changes on the Program to control budget, schedule, and Program scope. McMillen's PM will be imperative to ensuring that the Program stays within scope without scope creep by monitoring and controlling the Program scope, budget, and schedule. It is possible that a change in scope may be required throughout the development of the Program and a change order to the contract will be required. Program change refers to any change that impacts the originally approved Program scope, schedule, or cost baselines. Below is the TPU change control process for the Program:

The following steps comprise this Program's change control process:

Step #1: Identify the need for a change.

Step #2: Conduct an evaluation of the change.

Step #3: Submit change request to TPU Program Manager.

Step #4 through Step #5 are TPU internal change management approval steps. McMillen will follow the steps #1 through #3 through coordination with TPU Program Manager.

DELIVERABLES

- DRAFT Change Management Plan and Change Management Template (Word and PDF format)
- FINAL Change Management Plan and Change Management Template (Word and PDF format)

ASSUMPTIONS

- TPU review periods will be 10 business days, unless noted otherwise.
- The Change Management plan template will be provided as an appendix to the PMP (Subtask 1.7)
- McMillen will utilize internal Change Order Form templates to clearly define and capture the change to the scope and the potential change to the overall project budget and schedule, as needed.

SUBTASK 1.7 PROGRAM MANAGEMENT PLAN

Additionally, a PMP will be provided outlining the Program team, Program communication protocols, the Statement of Work, schedule, budget, quality control, and Program deliverables. The workplan will be produced at the beginning of a Program by the PM. By preparing the workplan, the PM has the opportunity to pre-plan all stages of the Program and finalize a schedule and budget for team members to follow. The workplan is distributed to the entire Program team (McMillen staff, subcontractors, and clients) for each team member to fully understand the Program scope of work, background, communication protocol, schedule, budget, and all team member's roles throughout the Program. Team members can refer to the workplan when questions arise throughout the Program. It also informs the team of what the PM's expectations for work tasks and deliverables are for the duration of the Program. The workplan expands on the following Program related topics:

- Program Team (Roles and Responsibilities Matrix, Subtask 1.3)
- Program Communication Management Plan (Subtask 1.3)
- Quality Control Plan (Subtask 1.2)
- Change Management Plan (Subtask 1.6)
- Health and Safety
- RACI Matrix (Subtask 1.3)

- Scope of Services and Task Descriptions
- Schedule (Subtask 1.4)
- Budgets and Cost Codes
- Risk Register (Subtask 1.5)
- Program Deliverable Standards

The workplan is an effective tool for the PM to help keep team members and subconsultants on track to deliver a project on schedule and right on or under budget.

DELIVERABLES

- DRAFT PMP (Word and PDF format)
- FINAL PMP (Word and PDF format)

ASSUMPTIONS

- Deliverables developed from Subtasks 1.2 through 1.6 will be provided as an appendix to the PMP.
- TPU review periods will be 10 business days, unless noted otherwise.

SUBTASK 1.8 TPU/MCMILLEN PROGRAM COORDINATION MEETINGS

McMillen proposes to set up recurring 1.5-hour Program coordination meetings via TEAMS every two weeks with TPU and their identified key personnel. These meetings will discuss Program tasks completed to date, current Program tasks, and two-week look ahead work projections. We will also review the action item list, identify any outstanding tasks, as well as additional items required for future work tasks. These meetings will include budget and schedule updates as needed. Our team will prepare and distribute a summary of the meeting minutes.

DELIVERABLES

- DRAFT TPU/McMillen Program Coordination Meeting Agenda (Word and PDF format)
- FINAL TPU/McMillen Program Coordination Meeting Agenda (Word and PDF format)
- DRAFT TPU/McMillen Program Coordination Two-Week Lookahead Schedules (Excel and PDF format)
- FINAL TPU/McMillen Program Coordination Two-Week Lookahead Schedules (Excel and PDF format)
- DRAFT TPU/McMillen Program Coordination Meeting Minutes (Word and PDF format)
- FINAL TPU/McMillen Program Coordination Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- The TPU/McMillen Program Coordination meetings will be held biweekly for 1.5 hours for the 2-year Program duration. The meetings will be held as follows:
 - Second Wednesday of Month 10:30 AM – 12:00 PM Pacific Standard Time (PST)
 - Fourth Wednesday of Month 11:00 AM – 12:30 PM (PST).
- One meeting will focus on Program Schedule updates and Risk Register updates.
- One meeting will focus on Program clarifications, team coordination, and will serve as a working meeting for the Program team.
- McMillen will provide TPU with the DRAFT meeting agendas before every TPU/McMillen meeting. These will be delivered to TPU the week prior on the first and third Tuesday of each month.
- The TPU/McMillen Program Coordination Meeting minutes, version 1, will be completed withing two working days of the scheduled meeting.

SUBTASK 1.9 McMILLEN TEAM PROGRAM COORDINATION MEETINGS

Jodi Burns, the PM, will coordinate the biweekly communication between team members and subconsultants in executing the work effort. The biweekly conference calls are intended to be a forum for discussing specific technical and coordination issues, develop action items, and identify follow up communication requirements with a smaller group. Internal communication which results in a specific direction regarding technical approach, scope, budget, or schedule shall be documented via a meeting record or email. Communication between internal team members to coordinate specific technical issues is encouraged as long as the results of the communication are conveyed to McMillen PM and team. However, internal team members are not to communicate with TPU team members directly until the Communication Plan (Subtask 1.3) developed by McMillen is approved by TPU.

McMillen will compile internal meeting minutes to track progress, schedule, and action items within the internal Program team. The following materials will be developed but will not be formally submitted to TPU for review.

- McMillen Team Program Coordination Two-Week Lookahead Schedules (PDF format)
- DRAFT McMillen Team Program Coordination Meeting Agenda (Word and PDF format)
- FINAL McMillen Team Program Coordination Meeting Agenda (Word and PDF format)
- DRAFT McMillen Team Program Coordination Meeting Minutes (Word and PDF format)
- FINAL Meeting Minutes (Word and PDF format)

DELIVERABLES

- No formally submitted deliverables to TPU for this subtask.

ASSUMPTIONS

- The internal McMillen Team Program Coordination Meetings will be held biweekly for up to one hour.
- McMillen will compile internal meeting minutes to track progress, schedule, and action items within the internal Program team. These meeting minutes will be internal and not submitted to TPU.

SUBTASK 1.10 PUBLIC OUTREACH SUPPORT

This task includes providing already prepared support documents for TPU's Major Projects Web Page. Documents that will be coordinated for inclusion on TPU's Major Projects Web Page include already prepared PowerPoint presentations, Meeting Minutes, and task and subtask deliverables.

DELIVERABLES

- No formally submitted deliverables to TPU for this subtask.

ASSUMPTIONS

- This includes coordination a total of 6 coordination hours per month for McMillen's PM and 6 coordination hours per month for McMillen's Civil Design Lead to coordinate with TPU.

TASK 2: TPU PARTNERING CHARTER/KICK OFF

McMillen will coordinate with TPU to perform a Partnering Charter/Kick Off meeting within one month of notice to proceed to allow the team time to review existing information and for the PM to complete the PMP. We will meet with the TPU team to discuss the overall project approach, PMP, schedule, and coordination efforts. A detailed review of the project schedule will be completed to determine and finalize dates for key milestone deliverables, review meetings, and biweekly progress meetings. As part of the kickoff meeting, McMillen recommends completing a thorough site investigation of the hatchery. During this site visit, additional data related to the existing facilities design, construction, and operation will be obtained as well as other data required to support the Project.

Each meeting will focus on presentation and discussion of the Partnering Charter, technical approach to the major project features, discussion of the approach to key technical issues, identify potential updates to the master plan, and confirmation of our technical workplan. The

objective of this discussion is to streamline McMillen PMP and Program Communications Plan to meet the specific objectives and eliminate any unnecessary work tasks.

McMillen anticipates four (4) four-hour meetings to complete the Partner Charter/Kick Off Meeting and one four-hour site visit. This is to ensure staff at multiple locations and workload schedules can be accommodated and for McMillen and TPU staff to meet. The following meetings are anticipated to accommodate the team's availability.

SUBTASK 2.1 TPU PARTNERING CHARTER/KICK OFF MEETING AT TPU

This subtask includes one (1) four-hour meeting at the TPU office in Tacoma, WA. The TPU Meeting in Tacoma, WA assumes two (2) days of travel and one four-hour meeting at TPU's offices. Up to six (6) McMillen personnel and one (1) subconsultant (GSI) will attend the meeting in Tacoma, WA.

SUBTASK 2.2 TPU PARTNERING CHARTER/KICK OFF MEETING AND COWLITZ TROUT HATCHERY SITE VISIT

This subtask includes one (1) four-hour meeting at the meeting conference room at the Salmon Hatchery Facility in Salkum, WA, with discipline specific TPU subject matter experts (SMEs). This meeting will include a four-hour site visit for team members at CTH. This meeting will include a four-hour meeting and then a four-hour site visit for team members. The onsite CTH facility Partnering Charter and Project Kickoff Meeting and Site visit in Salkum, WA assumes two (2) days of travel and one (1) full day on site at the hatchery facility (up to 8 hours). The site visit will be required to properly assess the facility. Up to ten (10) McMillen personnel and three (3) subconsultants will attend the meeting in Salkum, WA and CTH site visit in Toledo, WA.

SUBTASK 2.3 TPU PARTNERING CHARTER/KICK OFF MEETING VIRTUAL MEETINGS

This subtask includes two (2) four-hour virtual meetings. Up to 24 McMillen personnel and one (1) subconsultant (GSI) will attend the virtual meetings.

ASSUMPTIONS

- Agenda will include early discussions of the Basis of Design Task 6 and early sequencing and initiation of Basis of Design for Task 9 Ground Water Study. At a minimum sequencing of events for Subtasks 9.2 and 9.3.

SUBTASK 2.4 TPU PARTNERING CHARTER/KICK OFF MEETING DELIVERABLES

This subtask includes the development of the Program Charter Document, meeting agendas for each meeting described in Subtasks 2.1 through 2.3, and meeting minutes for each meeting

described in Subtasks 2.1 through 2.3. Additionally, McMillen will complete a Site Visit Summary to summarize the information and photos collected during the Subtask 2.2 site visit.

DELIVERABLES

- DRAFT Program Charter Document (Word and PDF format)
- FINAL Program Charter Document (Word and PDF format)
- DRAFT TPU Partnering Charter/Kick Off Meeting Agenda (Word and PDF format)
- FINAL TPU Partnering Charter/Kick Off Meeting Agenda (Word and PDF format)
- DRAFT TPU Partnering Charter/Kick Off Meeting Minutes (Word and PDF format)
- FINAL TPU Partnering Charter/Kick Off Meeting Minutes (Word and PDF format)
- DRAFT CTH Site Visit Summary (Word and PDF format)
- FINAL CTH Site Visit Summary (Word and PDF format)

ASSUMPTIONS

- All meeting materials will be provided to TPU one month prior to first scheduled Partnering Charter and Project Kickoff Meeting.
- The McMillen Program Communication Plan will be submitted to TPU prior to first Partnering Charter and Project Kickoff Meeting.
- TPU review periods will be 10 business days, unless noted otherwise.
- Access to all Hatchery Record Drawings has been sent to McMillen in early December of 2023. McMillen will review existing documents prior to the site visit (See Task 3.0).
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 3: DATA COLLECTION

SUBTASK 3.1 REVIEW EXISTING DATA

This task consists of collecting and reviewing existing data available on the Project including all topographic survey files completed by TPU to date, available water temperature and water quality information, release data (size and dates), available geotechnical information, and environmental requirements of the National Pollutant Discharge Elimination System (NPDES) permit, Air Quality permit, including preliminary design work from the Cowlitz HCRPP addressed by both FERC as well as HDR, Inc. The focus of this analysis is to assemble the data necessary to provide the foundation upon which the remaining work tasks will be executed.

SUBTASK 3.2 HCRPP AND HDR MASTER PLAN SUMMARY TECHNICAL MEMORANDUM

The PM will coordinate the review of existing data including the Cowlitz HCRPP with the Project team prior to the Program Kick Off Meeting. McMillen will prepare a technical memorandum (TM) summarizing the review of the HCRPP and the HDR Memorandum.

DELIVERABLES

- DRAFT Summary TM (Word and PDF format)
- FINAL Summary TM (Word and PDF format)

ASSUMPTIONS

- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

SUBTASK 3.3 PROGRAM BIBLIOGRAPHY AND DATA GAP SUMMARY

In addition to the review of this document, the PM will coordinate with TPU to get all existing information related to the Cowlitz Trout Hatchery Project. The information will be documented in a Program Bibliography of Data Sources. Any data gaps will be documented, as required, and the missing data will be requested from TPU as a resource.

DELIVERABLES

- DRAFT Program Bibliography of Data Sources and Summary of Data Gaps Memorandum (Word and PDF format)
- FINAL Program Bibliography of Data Sources and Summary of Data Gaps Memorandum (Word and PDF format)

ASSUMPTIONS

- TPU will provide the McMillen team with all available reports, as-built drawings, topographic survey files, and any additional technical data associated with the Cowlitz Trout Hatchery.
- The data collection includes review of TPU's AutoCAD standards.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 4: ENVIRONMENTAL

SUBTASK 4.1 PERMITTING SUPPORT FOR AREA OF POTENTIAL EFFECTS & HISTORICAL MITIGATION

TPU will be the lead federal agency for Section 106 of the National Historic Preservation Act. One Area of Potential Effect (APE) will be consulted on with the Department of Historical Preservation (DAHP), the Yakama and Cowlitz Tribes, and other stakeholders. The second phase to Section 106 consultation is to determine the level of effect. TPU will evaluate all the proposed ground-disturbing activities by conducting an archaeological survey within the APE. Due to the number of planned changes to the historic property there will likely be an adverse effect to many historic resources. A Memorandum of Agreement (MOA) will likely be required between DAHP, Tacoma Power, and other agencies i.e., the U.S. Army Corps of Engineers (USACE) and/or Washington State Department of Fish and Wildlife (WDFW). Mitigation will meet the effect and be determined by all signatories on the MOA. Phase 2 of CTH Design and Permitting for Determination of Effect (DOE) for both Historic and Archeological will be targeted for 2026, with a MOA target in 2027.

McMillen will support TPU to map the APE, provide a Program Permitting Matrix through coordination with TPU staff, and incorporate the information into the 10% design plans and 10% cost estimate. To support Section 106 consultation and avoid later reinitiation, McMillen will work with TPU to determine the primary components of project design, and the proposed construction means and methods. As part of this effort, the team would identify opportunities for avoidance or minimization measures.

DELIVERABLES

- APE in the most current version of ESRI GIS, AutoCAD and PDF printable on 11 x 17 inches and with scale.
- DRAFT Permitting Matrix (with schedule considerations). (Excel and PDF)
- FINAL Permitting Matrix (with schedule considerations). (Excel and PDF)
- Incorporation of proposed mitigation on 10% Plans (see Task 15).
- Scale of Costs (will be developed with Task 16).
- DRAFT APE Coordination Meeting Agendas (Word and PDF format)
- FINAL APE Coordination Meeting Agendas (Word and PDF format)
- DRAFT APE Coordination Meeting Minutes (Word and PDF format)
- FINAL APE Coordination Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.
- Section 106 will be summarized in the DRAFT and FINAL Permitting Matrix and will also be summarized Subtask 4.2.
- TPU has two (2) On-Call Services Contracts for Section 106 Historical and Archeological and will perform lead on regulatory permitting coordination with Wildlife and Lands (Natural Resources). regulatory permitting coordination (Power Safety and Environmental Compliance) for EPA (Air quality) and Department of Ecology (DOE) NPDES, Agency permitting with Lewis County (Natural Resources) and all coordination with environmental regulatory permitting and Technical Committees (Natural Resources). TPU will lead in all initial coordination with outside agencies. McMillen will not coordinate with outside agencies without TPU.
- TPU review periods will be 10 business days, unless noted otherwise.
- Assumes up to four virtual meetings with TPU staff. Meetings are assumed to be 1 hour each.

SUBTASK 4.2 PERMITTING ENVIRONMENTAL AND LOCAL AGENCY (SCOPING AND REPORT LIST)

McMillen will provide a comprehensive list of all regulatory permitting for Federal, State, and local permitting including the description narratives of the proposed work, and scheduling timelines expected from initiation to final approvals.

DELIVERABLES

- DRAFT Technical Memorandum (Word and PDF Format).
- FINAL Technical Memorandum (Word and PDF Format).
- Permitting Schedule (Microsoft Project and PDF format).
- Permitting schedule to be incorporated into overall Project schedule.

ASSUMPTIONS

- McMillen will not contact any regulatory agency. All coordination will be with TPU staff.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.
- McMillen assumes that contractors completing work under the Groundwater Rehabilitation Study Task 9 will be required by TPU to pull contractor permits directly with the Department of Ecology (DOE) for activities that do not meet Washington State DOE exemptions.

Discharging water during pumping activities or drilling processes to the Cowlitz River if approved by TPU.

- Regulatory permitting coordination (Power Safety and Environmental Compliance) for EPA (Air quality) and Department of Ecology (DOE) NPDES, Agency permitting with Lewis County (Natural Resources) and all coordination with environmental regulatory permitting and Technical Committees (Natural Resources). TPU will lead in all initial coordination with outside agencies. McMillen will not coordinate with outside agencies without TPU.

TASK 5: SURVEY COORDINATION – TPU SURVEY SERVICES

McMillen, in partnership with TPU, and Contour Engineering will lead coordination with TPU Surveyors, TPU SMEs, and On-Call Consultant Surveying Surveyors (Contour Engineer) for all Project related survey work and services including Ground Penetrating Radar (GPR). All Communications between McMillen and the designated surveying team will be shared directly with TPU. McMillen will develop with TPU and Contour Engineering Surveying SOW Task Order for TPU's approval prior to the start of the Work. The PM will plan and schedule surveying related tasks accordingly with ongoing tasks, deliverables, and facility schedules.

SUBTASK 5.1 Q3 SURVEY SCOPE OF WORK PREPARATION

For the Q3 2024, McMillen will review the survey information completed by TPU in Q4 2023 and Q2 2024 comprehensive set of facility drawings (provided December 2023), and available record data to determine the survey scope. McMillen will co-lead coordination in developing the survey SOW to include and not limited to utilities, and coordinate locates of potential underground utilities detected by GPR with TPU and Contour Engineering, and geotechnical investigations. McMillen will provide scheduling and on-site coordination with TPU engineer staff, subconsultants and ongoing facility and Project related Work/Tasks. All survey SOW Memorandum will include tasks, schedule, and delivery dates.

DELIVERABLES

- DRAFT Task Q3 2024 Survey SOW Memorandum (Word and PDF format)
- FINAL Task Q3 2024 Survey SOW Memorandum (Word and PDF format)
- DRAFT Survey Coordination Meeting Agendas (Word and PDF format)
- FINAL Survey Coordination Meeting Agendas (Word and PDF format)
- DRAFT Survey Coordination Meeting Minutes (Word and PDF format)
- FINAL Survey Coordination Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- Existing topographic information compiled by TPU to date will be reviewed under Task 3: Data Collection. McMillen will review all TPU provided as-builts drawings, existing surveys, and record data relative to survey under Task 3.
- All survey and any GPR efforts would be completed by an outside utility locate company capable of these services and will be completed by TPU Surveyors, TPU SMEs, and On-Call Consultant Surveying Surveyors (Contour Engineer) for all Project related survey work and services including GPR.
- TPU will survey measuring point elevations and locations of the permanent monitoring well installations.
- McMillen's Civil Design Lead to complete the Scope of Work Memorandum. McMillen PM will review and support the SOW.
- McMillen will attend three (3) 1.5-hour pre-coordination meetings with Contour and TPU staff to coordinate the SOW.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

SUBTASK 5.2 Q3 SURVEY FIELD WORK

This subtask includes the survey field work for coordination and support to TPU's survey team. McMillen's Civil Design Lead and Senior Hydraulic Engineer will be on site to coordinate the Q3 Survey effort.

DELIVERABLES

- No formally submitted deliverables to TPU for this subtask.

ASSUMPTIONS

- It is assumed that McMillen's Civil Lead and Hydraulic Lead will be on site for five business days and two days of travel to complete the Q3 Survey effort.
- TPU will need one month's advance notice to schedule the appropriate staff to be on site with McMillen discipline leads during the Q3 Survey effort.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 6: BASIS OF DESIGN MEMORANDUM

McMillen will prepare a Basis of Design Memorandum to support and direct the water supply alternatives analysis, hatchery facility alternatives analysis, and it will be updated in the development of 10% design (see Task 15.0). The McMillen Team will prepare a Basis of Design Memorandum that summarizes the pertinent data and design criteria for each of the engineering disciplines which will be used in developing the design for the Program. The intent of Basis of Design Memorandum is to provide a detailed summary of the criteria associated with the Program which will serve as the basis for the design development. Using the data provided by TPU and review by the McMillen Team in Task 3.0, the McMillen team will prepare a detailed description of the anticipated operating parameters and scenarios under which the Project will be operated.

An initial draft of the Basis of Design Memorandum will be prepared and submitted to TPU for review and comment. McMillen will then present the design criteria ahead of any Alternatives Analysis Workshops with TPU. This will be to allow in-depth discussions and understanding of the design criteria and operating parameters upon which the design will be based. The design criteria will be updated on a regular basis during the performance of the engineering and design work as the design develops and additional information is obtained. As the design is advanced, the Basis of Design Memorandum will be updated to support the 10% Design development further described in Task 15.0.

DELIVERABLES

- DRAFT Basis of Design Memorandum (Word and PDF format).
- Revised DRAFT Basis of Design Memorandum (Word and PDF format).

ASSUMPTIONS

- The Basis of Design Memorandum will be provided to TPU for review and comment a minimum of one month prior to the Basis of Design Coordination Workshop.
- The Basis of Design Coordination Workshop will include one four-hour workshop virtual via Microsoft Teams to coordinate the design criteria for the Project.
- The following McMillen Team members will be responsible for preparing the Basis of Design Memorandum:
 - Project Manager – Will review the overall memorandum.
 - QAQC Manager – Will facilitate the QAQC review of the documents.
 - Senior QC – Senior independent technical review of memorandum for each discipline.
 - Civil Lead – Will lead the development of the Civil Design Chapter.

- Sr. Biologists – Will direct the Jr. level to develop the Biologic Design Chapter.
- Jr. Biologist – Will lead the development of the Biologic Design Chapter with direction and oversight from Sr. Biologist.
- Sr. Aquaculture Engineer – Will review the development of the Civil, Hydraulic, and Mechanical sections to be sure that they are aquaculture focused.
- Sr. Hydraulic Engineer – Will direct the staff level to develop the Hydraulic Design Chapter.
- Staff Hydraulic Engineer – Will lead the development of the Hydraulic Design Chapter with direction and oversight from Sr. Hydraulic Engineer.
- Sr. Mechanical Engineer – Will direct the staff level to develop the Mechanical Design Chapter.
- Staff Mechanical Engineer – Will lead the development of the Mechanical Design Chapter with direction and oversight from Sr. Mechanical Engineer.
- Sr. Structural Engineer – Will direct the staff level to develop Structural Design Chapter.
- Staff Structural Engineer – Will lead the development of the Structural Design Chapter with direction and oversight from Sr. Structural Engineer.
- Sr. Electrical Engineer – Will direct the staff level to develop Electrical and Instrumentation Design Chapters.
- Staff Electrical Engineer – Will lead the development of the Electrical and Instrumentation Design Chapters with direction and oversight from Sr. Electrical Engineer.
- Sr. Geotechnical Engineer – Will direct the staff level to develop Geotechnical Design Chapter.
- Staff Geotechnical Engineer – Will lead the development of the Geotechnical Design Chapter with direction and oversight from Sr. Geotechnical Engineer.
- As part of this task, McMillen will review and incorporate TPU review comments prior to further development of the Basis of Design Memorandum during the 10% Design (Task 15.0).
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 7: UPDATE BIOPROGRAMMING REPORT & MODEL

SUBTASK 7.1 BIOPROGRAM MODEL UPDATE

The core attributes associated with the Bioprogram model update include developing and/or verifying the aquaculture space and water requirements for the stated fish program:

- 308,500 Lower Cowlitz winter steelhead to 7 fish per pound (fpp) and released on-station.
- 100,000 Tilton winter steelhead to 7 fpp and released on-station.
- 236,000 Upper Cowlitz winter steelhead to 7 fpp and released on-station.
- 650,000 summer steelhead to 5.5 fpp and released on-station.
- 110,000 sea-run Cutthroat Trout to 4 fpp and released on-station.

System flow, sizing information obtained from the modeling efforts will then be applied to a two-year fish production and water budget schedule to illustrate production overlap (if any) and identify maximum water use months. This information will assist design efforts as well as identifying potential infrastructure needs (or reductions) that would result in impacts to the overall water supply.

As part of an initial biological programming (bioprogramming) exercise, a biological “verification” of the current aquaculture program will be tied to water flow requirements. As part of the exercise McMillen will determine an approximate target water flow for peak periods of production (at minimum; ideally month mean requirements). McMillen has initially prepared a CTH bioprogram and the assumed program maximum flow requirements stated in the RFQ/P (Task 4.1 Update Bioprogramming Report & Model, Figure 3; page 23; maximum water requirement of up to 72 cfs in May of rearing calendar) conflict with estimated peak flows required when using an industry-standard Flow Indices (Piper’s Flow Index). The basis of a sound aquaculture design in intensive aquaculture systems requires a thorough understanding of the biological oxygen and diseases of concern requirements of the target fish species as well as a thorough understanding of the oxygen supplied in system water supplies (which is obtained from water supply quantities during peak fish production). Maximum water flow requirements tied to fish production metrics need to be confirmed in advance of detailed water supply studies; an advance verification is a relatively straightforward process requiring an understanding (confirmation) of fish numbers, sizes, and aquaculture rearing parameters (Flow Index in this case).

The McMillen Team understands that development of bioprogramming products and models is an interactive process that will require key input from TPU and Washington Department of Fish and Wildlife (WDFW) staff. Using species-and stock-specific growth attributes and

programmatic sizing requirements (fish size, numbers, biomass, rearing calendars) provided by TPU and WDFW staff guidance, the McMillen Team would work with TPU (and WDFW as requested by TPU) to develop and/or verify aquaculture flow and density indices required.

Acknowledging the need for “Bioprogramming Models” and associated “native software,” McMillen will create a new Bioprogramming model in Microsoft Excel format and will provide the native files as a deliverable to TPU. McMillen will work directly with TPU and TPU will work with WDFW staff as point of contact interface with WDFW to determine the true data input/data output needs and requirements for the Program. The McMillen Team will work collaboratively with program users to provide data tracking and reporting that meets the needs of the overall program.

DELIVERABLES

- DRAFT Biological Program Model (Excel and PDF format)
- FINAL Biological Program Model (Excel and PDF format)

ASSUMPTIONS

- While custom software programs are an option that may assist aquaculturists and Program managers with growth estimates, feed projections and production forecasting, similar growth and fish programming metrics are easily tracked with common spreadsheet (Microsoft Excel) applications that may not require elaborate software systems and routine upgrades. Microsoft Excel models developed by McMillen will be utilized and shared with TPU.
- The model will account for multiple egg takes (TPU will provide examples) across the programs and will detail movement from incubation to marking to release. Ideally on a weekly basis. TPU can provide the relevant timeframes and growth trajectories to help model this effort.
- TPU review periods will be 10 business days, unless noted otherwise.
- McMillen will not coordinate with WDFW unless directed by TPU.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

SUBTASK 7.2 BIOPROGRAM REPORT

After completion of the Bioprogram Model, McMillen will prepare a Biological Design Criteria Report that will summarize the biological and aquaculture design criteria that will be used as the basis for the development of the Water Supply Alternatives Analysis (Task 11) and the Hatchery Facility Alternatives Analysis (Task 13). The criteria presented within this report provide key water supply demands that will serve as the foundation of the Water Supply

Alternatives and fish culture facility programming information that will serve as the foundation for the Hatchery Facility Alternatives Analysis to evaluate potential modifications to the existing fish hatchery facility, as well as the selected alternative design development.

DELIVERABLES

- DRAFT Biological Design Criteria Report (Word and PDF format)
- FINAL Biological Design Criteria Report (Word and PDF format)

ASSUMPTIONS

- The Biological Design Criteria Report will summarize the required flow and rearing volumes for each life stage. Full reuse and partial reuse will be evaluated in Subtask 13.2 Outdoor Rearing System Analysis where recirculation aquaculture systems (RAS) and partial recirculation aquaculture systems (PRAS) will be evaluated as alternatives and disease will be considered in the evaluation. However, based upon the information collected during the Task 9 Groundwater Rehabilitation Study, a high-level analysis of full or partial reuse may need to be evaluated as part of the Task 11 Water Supply Alternatives Analysis based upon long term groundwater and surface water availability.
- TPU review periods will be 10 business days, unless noted otherwise.
- The Biological Design Criteria Report will be provided as an appendix to the Water Supply Alternatives Analysis Report.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

SUBTASK 7.3 BIOPROGRAM WORKSHOPS

This task also includes workshops between McMillen and TPU to identify and clarify design related criteria for the bioprogram development process. McMillen will attend two (2) four-hour virtual workshops present the bioprogram. The workshops will be as follows:

- Workshop No. 01 – Development of Biological Design Criteria: The purpose of this meeting is to agree on the inputs to the bioprogram model. The biological design criteria will be developed initially by McMillen, reviewed by TPU, and then reviewed between McMillen and TPU SMEs during the meeting. The meeting will be documented in the meeting minutes. The design criteria will need to be reviewed and agreed to by TPU to provide an efficient and effective means of evaluating each hatchery component. This will allow proper evaluation of the needs of the Cowlitz Trout Hatchery.
- Workshop No. 02 – Bioprogram Model Review: The purpose of this meeting is to go through the bioprogram in detail. This includes the step-by-step review of inputs to the

Microsoft Excel model and clarification of the outputs. The meeting will be documented in the meeting minutes.

DELIVERABLES

- DRAFT Bioprogram Workshop Agendas (Word and PDF format)
- FINAL Bioprogram Workshop Agendas (Word and PDF format)
- DRAFT Bioprogram Workshop Meeting Minutes (Word and PDF format)
- FINAL Bioprogram Workshop Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- McMillen will attend two (2) four-hour virtual workshops using Microsoft Teams to coordinate and present the bioprogram.
- TPU review periods will be 10 business days, unless noted otherwise.
- Meeting materials will be provided one month in advance of meeting.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 8: OZONE TREATMENT FACILITY STUDY

The existing ozone treatment facility treats up to 20 cubic feet per second (ft³/sec) of surface water, which is currently approximately 50 percent of the hatchery water demand. TPU made upgrades to the ozone treatment facility in 2020/2021. The purpose of this study is to evaluate the efficiency of the existing ozone treatment facility and to coordinate with TPU staff on potential alternatives if additional ozone treatment will be required beyond the existing 20 ft³/sec capacity. Increasing the ozone treatment capacity will be dependent upon the flow demand for the hatchery determined by the bioprogram (Task 7) and the results of the groundwater rehabilitation study (Task 9). Pathogen-free groundwater is an ideal water resource for the hatchery; however, it may be determined during the groundwater rehabilitation study that there is not enough groundwater capacity to meet the hatchery flow demands, or the development of the groundwater supply is not feasible.

SUBTASK 8.1 OZONE SYSTEM ALTERNATIVES DEVELOPMENT

TPU has provided McMillen with data from the CTH Ozone Treatment Facility from 2021 through 2023. This task includes a summary of the following for the Ozone Treatment System based upon the results of the bioprogram and groundwater rehabilitation study:

- Required water treatment capacity in cubic feet per second (ft³/sec).

- Recommended alternatives/infrastructure to achieve this water treatment capacity.
- Adequacy (i.e., spare capacity) of the existing ozone generation system, especially during turbidity events.
- Estimated additional capacity required to both achieve the required water treatment capacity and maintain the ability to respond during turbidity events to prevent breakthrough.
- Permit implications associated with expansion of the existing ozone generation system and associated air quality concerns.
- Water flow control (especially if divided between new and existing treatment basins) to ramp up/down to meet hatchery demands. How do we control ozone distribution in a way that we can maintain adequate water treatment (especially if divided between new and existing treatment basins with variable flow).

Additionally, this task includes completing interviews with existing TPU staff involved with the recent ozone upgrade in 2020/2021, development of potential alternatives with TPU staff that will be analyzed in the Water Supply Alternatives Analysis and completing up to three (3) virtual four-hour workshops with the core TPU Team members.

DELIVERABLES

- DRAFT Ozone Alternative Summary TM (Word and PDF format)
- FINAL Ozone Alternative Summary TM (Word and PDF format)
- DRAFT Ozone System Workshop Agendas (Word and PDF format)
- FINAL Ozone System Workshop Agendas (Word and PDF format)
- DRAFT Ozone System Workshop Meeting Minutes (Word and PDF format)
- FINAL Ozone System Workshop Meeting Minutes (Word and PDF format)

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 8.2 OZONE SYSTEM AIR STRIPPER INSPECTION

This optional subtask includes the inspection of the air stripping system connected to the ozone system. The following scope will be included as part of the inspection:

- Conduct a field inspection of the existing system to determine the conditions of the air stripping towers including fiberglass vessel condition, media, stainless steel bolts and hardware, piping system, electrical panels and systems, blowers, and enclosures.

- Review the operation records to confirm operation and identify any potential issues with performance degradation over time.
- Review the maintenance logs to identify areas which display consistent degradation over time.
- Prepare a TM which summarizes the field inspection observations with photos, support information, and summary of identified operation, condition, or maintenance issues.
- Provide recommendations for improvements to the existing system, if required.

DELIVERABLES

- DRAFT Ozone Air Stripping Inspection Summary TM (Word and PDF format)
- FINAL Ozone Air Stripping Inspection TM (Word and PDF format)

ASSUMPTIONS:

- A list of alternatives will be developed in close coordination with TPU staff as part of subtask 8.1; however, the alternatives will be fully analyzed in the Water Supply Alternatives Analysis (Task 11.1).
- Meeting materials will be provided one month in advance of meeting.
- McMillen will attend three (3) four-hour virtual workshops using Microsoft Teams to coordinate and present the ozone analysis and coordinate potential alternatives with TPU staff.
- The Ozone Alternative Summary TM will be provided as an appendix to the Water Supply Alternatives Analysis Report.
- As part of the optional task to inspect the air stripper system (Subtask 8.2), McMillen's mechanical and electrical team will attend a one-day site visit to the CTH to inspect the air stripper system. This assumes one full day on site and two partial days of travel to the hatchery site.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 9: GROUNDWATER REHABILITATION STUDY

Pathogen-free groundwater from the South Wellfield is an integral part of the hatchery water supply. Structural deterioration of individual wells, oversized pumping systems, and well configurations that limit pump setting depths have been identified as issues that are affecting the capacity and reliability of the South Wellfield source. Interference drawdown between wells

also likely significantly contributes to reducing the overall capacity of the wellfield, particularly during periods of higher demands (more wells pumping) and seasonally low river stages. Additionally, potential leakage of the existing well distribution system has been indicated which may result in loss of groundwater supply from the South Wellfield to the hatchery.

In addition, TPU is interested in assessing the potential to develop a collector well or vertical wellfield to use riverbank filtration to capture higher quality water from the river than the existing surface water intakes or other upland location as provided by TPU. The potential to develop substantial supply capacity from a riverbank filtration source is a key factor for planning hatchery improvements, including treatment and rearing design elements.

TASK OBJECTIVES

The key objective of this task is to identify opportunities to improve the capacity and reliability of the existing wells comprising the South Wellfield, and to identify and assess the potential for developing a source of capacity from the aquifer adjacent to the north bank of the river.

APPROACH AND SCOPE

The overall approach to the groundwater rehabilitation and development study will combine detailed evaluations of individual sources and mechanical systems with an updated assessment of the hydrogeologic setting to identify potential opportunities and constraints with improving the capacity and reliability of the existing hatchery groundwater supply, and to investigate the potential to develop a riverbank filtration source on the north side of the river. The study will consist of three primary subtasks, including:

- Subtask 9.1 Hydrogeologic Conceptual Model Refinement
- Subtask 9.2 North Wellfield Riverbank Filtration Source Assessment
- Subtask 9.3 South Wellfield Condition Assessment
- Subtask 9.4 Groundwater Infiltration Assessment

The scope of services for each of these subtasks is summarized below.

SUBTASK 9.1 HYDROGEOLOGIC CONCEPTUAL MODEL REFINEMENT

The goal of this subtask is to synthesize and update the conceptual hydrogeologic model of the shallow alluvial aquifer system to provide the framework for evaluating groundwater sources of supply for the hatchery. The updated conceptual model will be used to identify potentially favorable locations to evaluate for development of a North Wellfield riverbank filtration source(s), and to refine the estimate of the reliable capacity of the South Wellfield under current

conditions and after rehabilitation. The hydrogeologic conceptual model refinement will include the following second-order subtasks and work elements:

SUBTASK 9.1.1 DATA COLLECTION

This subtask will include:

1. Identify existing monitoring and test wells installed during initial site investigations in 1966 and 1967. Inspect and screen existing wells to select as many as five to instrument with pressure and temperature reading transducer/data logger units: we anticipate that two units may be installed in wells in the vicinity of the South Wellfield production wells, and as many as three may be installed in test wells and monitoring wells located along the north bank of the river.
2. Purchase 10 transducers and a barometric pressure logger and install as many as five transducers in the selected wells. The remaining transducers will be deployed in test and monitoring wells during testing of each location selected for evaluation of riverbank filtration source potential, as described in Subtask 9.2. The selected transducers will be standalone datalogging units and will not be connected or interface with the hatchery Plant Control System, unless requested by TPU. If the transducers will be connected into the existing Plant Control System, TPU shall review and approve the selection of the transducers.
3. Complete water level data downloads from transducers installed in wells selected for longer-term monitoring seasonally (four seasonal field visits) to evaluate seasonal variability in water levels at up to five select locations.
4. Coordinate with TPU to acquire synchronous river level data from existing hatchery supply instrumentation located at the intake structure to assess river/groundwater connectivity. McMillen will covert NGVD29 data as supplied by TPU to the Hatchery control Datum NAVD88 monumentation. McMillen shall supply time increments (hourly, daily, minute, years to TPU to compile data from the historian.
5. Synthesize manually recorded measurements of temperature and precipitation collected by TPU hatchery staff.

SUBTASK 9.1.2 GEOPHYSICAL SURVEY

The purpose of this task is to use surface resistivity methods to map the interface between the recent alluvial sedimentary aquifer and underlying older consolidated sediments to identify variability in thickness and possibly lithology adjacent to the river. The results of the geophysical survey will be used together with information from existing wells to identify locations to further evaluate the potential to develop riverbank filtration sources in Subtask 9.2, and the potential degree of recharge from the river from the location and nature of the aquifer/river connection.

1. Review utility surveys, as available to identify the presence of potential interferences (e.g., buried, and overhead utilities). Complete a pre-survey site visit with the geophysical survey subcontractor to confirm potential interferences, identify potential accessibility and safety constraints within the area of interest and to site the survey lines.
2. Complete pre-survey line preparation such as minor brushing, where needed and allowed.
3. Complete two surface resistivity survey transects of approximately 3,500 feet in length oriented approximately parallel to the river: one adjacent to the riverbank, and one between 200 and 300 feet north of the riverbank. The transects will run from the edge of the parcel located west of the rearing ponds to the parcel edge east of the surface intake structure.
4. McMillen will coordinate with TPU to identify existing well and septic fields.

SUBTASK 9.1.3 CONCEPTUAL MODEL UPDATE

The purpose of this subtask is to synthesize information and interpretations from previous studies with water level and other operational data collected by TPU, precipitation data, the geophysical survey (Subtask 9.1.2), water level data acquired as part of this work (Subtask 9.1.1), and groundwater quality data to update the conceptual hydrogeologic model for the aquifer system on the north and south sides of the river. The conceptual model update will expand on prior work to evaluate the distribution and nature of the recent alluvial sediments that host the primary supply aquifer, including:

1. Develop maps of the top of the consolidated sediment surface, the thickness of the recent alluvial sediments and groundwater elevations to identify areas of greater saturated thickness adjacent to the north bank of the river.
2. Evaluate connectivity with the river and other recharge sources (i.e., precipitation)
3. Identify areas with more/less suitable water quality conditions, as able, using available historical water quality data collected by TPU and contractors, including from South Wellfield, observation and test wells and domestic supply well.

The conceptual model will be used to accomplish the following objectives:

1. Identify areas to explore for evaluating riverbank filtration source development on the north bank of the river based on locations where the saturated thickness of productive aquifer materials is in connection with the river.
2. Assess the degree river contributes to recharge of the alluvial aquifer hosting the South Wellfield and how river/aquifer exchanges may vary seasonally relative to precipitation to better understand the effects of climate change on aquifer recharge and reliable yield.

3. Aid in estimating well interference within the South Wellfield for developing recommendations for the design of new wells and pumping system improvements.

DELIVERABLES

- Water Level Monitoring Equipment Submittal (Word and PDF format)

SUBTASK 9.2 NORTH WELLFIELD RIVERBANK FILTRATION SOURCE ASSESSMENT

TPU is interested in reassessing the potential for developing a riverbank filtration source to supply at least some portion of the hatchery demands with higher quality water than is currently supplied by its surface intake source. Key considerations for evaluating the potential to develop a riverbank filtration source on the north bank of the river will include the estimated reliable capacity and water quality (iron and biological pathogens). Robinson & Noble (R&N; 1967) with Ranney Corporation previously evaluated the potential to develop one or more collector well systems on the north bank of the river to supply the entire hatchery's water needs.

The approach to re-evaluating the potential for developing a riverbank filtration source, such as a collector well(s), will involve (1) re-assessing the areas that were previously tested by R&N to confirm capacity estimates using more modern analytical tools, and to evaluate water quality conditions; and (2) identify and test potentially promising areas to be identified as part of Subtask 9.1.3.

SUBTASK 9.2.1 FIELD WORK PREPARATION

Preparation for invasive field explorations will include the following work elements:

Soil and Water Management Plan Development and Approval

1. Soil Management Plan: A soil management plan will be developed for managing drill cuttings (anticipated to be 7 – 9 cubic yards in total) to include analytical testing analytes and methods to assure proper disposal. A composite sample of the aggregated soil cuttings contained in a roll-off box will be submitted for analysis of petroleum hydrocarbons and metals to assess whether additional analysis is needed and to evaluate. Soil cuttings shall be managed in accordance with the requirements in the plan.
2. Water Management Plan: A water management plan will be developed that outlines alternatives for discharge of water from well development and test pumping activities, including conveyance and discharge locations, energy dissipation and water distribution plans, sampling, and analysis, and how traffic flow will be maintained. Candidate discharge locations currently include (1) the rearing ponds, (2) the parcel located west of the rearing ponds and (3) the river. The first two will need a road crossing that maintains

access for users of the recreational access to the river. The alternatives will be reviewed by TPU environmental and hatchery staff to identify constraints and requirements relative to hatchery operations, protection of environmental assets and permit compliance for selection of a preferred alternative(s) for discharge locations. Natural Resources is delegating any Department of Ecology (DOE) Permitting required for discharge directly to the Cowlitz River. Water generated during drilling, development and testing will be managed in accordance with this plan and applicable permits.

3. Groundwater samples will be collected from as many as two existing wells completed in the shallow alluvial aquifer for chemical analysis to support the decision process for water discharge alternatives. Possible locations include the existing domestic supply well and suitable pre-existing observation or test wells near the north bank of the river. The samples will be analyzed for general chemistry parameters (common ions) and metals. Results will be reported to TPU to aid in selecting water discharge locations.

Well Condition Assessment and Well Location Selection

This subtask includes locating pre-existing test and observation wells from R&N exploratory work in 1966/67 and determining their suitability for testing and monitoring:

1. Open and complete video surveys of two of three test wells purportedly to still exist in the vicinity of the boat launch that were tested by R&N, including BN5, BN7 and BN21.
2. Work with collector well experts at Ranney Corporation's successor Layne Corporation (Layne) to reevaluate capacity estimates from previous testing using modern analytical tools and to refine the design of tests and test/observation well locations for the original sites (BN5 and BN7) and up to two additional sites to be selected on the basis of the work completed in Subtask 9.1.3.
3. Preliminarily select new test well and observation well locations based on the assessment of existing wells in the vicinity of the BN5 and BH7 areas, and from two additional sites. Confer with TPU staff to identify constraints and requirements for drilling and testing wells at the selected locations.
4. Coordinate with utility mapping project group, including GPR contractor regarding the potential presence of utilities relative to well locations (Task 5 Survey Coordination).
5. Inspect the existing domestic supply well and instrument with a pressure transducer/data logger to assess drawdown effects during pumping tests.

SUBTASK 9.2.2 DRILL AND CONSTRUCT TEST AND OBSERVATION WELLS

The purpose of this subtask is to complete test wells and observation wells at as many as four sites (Subtask 9.2.1) to evaluate the potential to develop a riverbank filtration source along the north side of the Cowlitz River. Specific work tasks include:

1. Test Wells: Drill up to four test wells as follows:

- Drill a test well at one or potentially both of the BN5 and BN7 test well locations should the pre-existing test wells at those locations be found to no longer exist or be serviceable (Subtask 9.2.1). The purpose of retesting existing wells or reestablishing test wells (if necessary) at these locations is to confirm the potential yield and design parameters for a riverbank filtration facility(ies) at these locations using modern analytical methods.
- Two test wells will be completed at two new locations identified from the conceptual model update; the general areas of interest are along the north riverbank (1) near the east end of the rearing ponds, and (2) in the area on either side of the surface intake at the east end of hatchery property.
- Temporary test wells will consist of 8-inch diameter casing advanced using 12-inch roto-sonic methods and be completed with 5- to 10-foot-long wire-wrap screens with a coarse-grained formation stabilizer and bentonite surface seal. The temporary wells will be installed, constructed, and decommissioned in accordance with Washington State well construction and maintenance standards.
- Contain drill cuttings in a rolloff container for profiling and disposal per the Soil Management Plan (Subtask 9.2.1).
- Develop the new and any suitable existing wells by surging and pumping to establish hydraulic connection with the aquifer.
- Manage water generated during drilling, development and testing consistent with the Water Management Plan and applicable permit requirements.
- Submit two samples from each test well (total of 8) for grain-size analyses of aquifer materials for assessment of riverbank filtration well capacity and design parameters.
- Decommission the new test wells, after consultation with TPU, by filling with bentonite or grout slurry and cutting the surface casing off below ground surface.

2. Observation Wells: Drill and complete between 9 and 12 observation wells distributed between the four test well sites. The final number of observation wells will be determined after (1) assessing the presence, condition, and suitability of existing wells from 1966/67 testing, and (2) consultation with Layne collector well experts (Subtask 9.2.1).
- Advance 6-inch diameter boreholes using a track-mounted rotosonic drilling rig at selected locations. Construct 2-inch PVC monitoring wells in each boring with a 5 to 10-foot length of factory-slotted PVC screen, formation stabilizer and a bentonite surface seal, in accordance with Ecology monitoring well construction standards.
 - As many as four wells may be completed as permanent installations subject to concurrence by TPU, for collection of longer-term water level and temperature data over one or more full water years to confirm groundwater/surface water connectivity. The permanent installations will have a locking protective monument and traffic bollards installed per Ecology regulations.
 - Contain drill cuttings in a rolloff container for profiling and disposal per the Soil Management Plan (Subtask 9.2.1) and manage as follows:
 - Collect a composite soil sample from the consolidated drill cuttings and submit to a laboratory for chemical analysis of NWTPH-Gx/Dx, volatile organic compounds (VOCS), RCRA (8) metals, and polycyclic aromatic hydrocarbons (PAHs). Depending on solid waste facility requirements, the sample may also be analyzed for leachable metals by toxicity characteristic leaching procedure (TCLP) analysis.
 - Submit chemical analysis to the selected solid waste facility and arrange for hauling and disposal.
 - Surge and pump to develop each observation well to establish hydraulic connection with the formation. Water generated during development of each observation well will be managed in accordance with the Water Management Plan.
 - Decommission select observation wells in accordance with Ecology standards.

SUBTASK 9.2.3 AQUIFER TESTING

The purpose of this subtask is to evaluate the potential yield and water quality of one or more riverbank filtration supply sources by conducting pumping tests at four locations sequentially. The work elements of this subtask are as follows:

1. Install temporary continuous-reading pressure transducers in observation wells and the test well at each site.
2. Install a temporary continuous-reading pressure transducer in the domestic supply well for the hatchery if accessible prior to drilling in proximity of the domestic well. TPU staff will be contacted two weeks prior to any drilling to obtain access to the domestic supply well for instrumenting it.
3. Install hand-driven well points (stainless steel tubes) 1 – 3 feet into the riverbed near each test well location to evaluate connectivity with the river during pumping; instrument the well points with pressure transducers. Remove the well points at the conclusion of testing.
4. Install pumping test equipment:
 - Install discharge piping and ancillary equipment (e.g., flow meter, energy dissipation equipment) per the selected alternative for each test site in the Water Management Plan (Subtask 9.2.1.1).
 - Install a test pump capable of up to 800 gallons per minute (GPM) in a test well and complete a short shake-down (less than 30 minutes) equipment test.
5. Complete a constant rate pumping test at each of four test well locations in accordance with test protocols determined in consultation with Layne collector well experts as follows:
 - Pump each test well for a period of 24 to 48 hours; the final duration will be determined by hydraulic test data results and water quality field parameter measurements.
 - Collect periodic manual water level measurements to verify transducer level readings, including in the hatchery domestic supply well.
 - Continuously monitor field water quality parameters in the discharge water including pH, specific conductance, temperature, and turbidity.
 - Collect water quality samples from the test well at three intervals: (1) within 15 minutes of startup, (2) at the midpoint of the test (minimum of 12 hours), and (3) at the end of the test. Submit samples for analysis of aquaculture chemical analytical parameters, including general chemistry, PCBs, and metals as well as pathogens. McMillen's aquaculturists/biologists will review the results of the sampling effort.
 - At the completion of testing at each location, remove the pump, power, and discharge line.

- Download electronic data for analysis from the test well, observation wells and the domestic supply well, and collate electronic data and written field notes.

DELIVERABLES

- DRAFT Soil Management Plan (Word and PDF format).
- FINAL Soil Management Plan (Word and PDF format).
- DRAFT Water Management Plan (Word and PDF format).
- FINAL Water Management Plan (Word and PDF format).

SUBTASK 9.3 SOUTH WELLFIELD CONDITION ASSESSMENT

The goal of this subtask is to assess the condition of the existing production wells and distribution system in the South Wellfield to identify and recommend potential improvements that could increase the reliability and individual and collective yield of the wells to inform the alternatives evaluation in Task 11. Field work will be timed for a period beginning the third week in August (earliest) through mid-November. Contractor shall ensure at least one well is operational during the assessment period. The scope of work will include the following elements:

SUBTASK 9.3.1 EVALUATE BASELINE CONDITION AND PERFORMANCE OF WELLS

This subtask will involve analysis of data and notes from the review of historical reports, as-built construction diagrams, and past well performance testing and operational data completed in Subtask 3.1. The purpose of the analysis of prior data is to understand the initial performance of individual wells with which to compare to performance testing to be completed under Subtask 9.3.2.

SUBTASK 9.3.2 WELL CONDITION ASSESSMENTS

The purpose of this subtask is to complete a condition assessment of each of nine production wells in the South Wellfield to assess performance, structural conditions, and mechanical systems. The task will involve completing performance tests to compare with baseline data (Subtask 9.3.1), removing pumping systems and completing well video surveys, and assessing mechanical, electrical and control systems. Invasive work involving pulling pumps will be completed when the wells are not needed so the wells can be taken out of service in batches to facilitate evaluations.

1. **Performance tests:** Complete a short-term (1 – 4-hour duration) pumping test of each of 9 supply wells. as follows:

- For seven wells with existing production pumps, coordinate arrangements with hatchery operations staff to conduct pumping tests with existing pumping systems and SCADA instrumentation for water level measurements.
 - For two wells (#5 and 7), install a test pump and supply a generator for power and install a temporary pressure transducer for water level measurements.
 - Install discharge equipment, including discharge piping (6-inch flange) on the existing blow-off piping, a calibrated flow meter and energy dissipation equipment; for wells 1 – 6, water will be discharged by spreading along the right-of-way. For wells 7 – 9, discharge piping will be laid between the wells and property owned by TPU to the south. Discharge water will be managed in accordance with the Water Management Plan.
 - Complete well performance tests and monitoring pumping water levels with the assistance of hatchery staff for wells with existing production pumps, and with subcontractor staff for the wells lacking production pumps.
2. **Physical Condition Assessments:** The purpose of this work element is to assess the physical condition of the wells, as follows:
- Disconnect piping, electrical and control systems.
 - Remove the pumps from individual wells with existing production pumps. The pumps and columns will be set on timbers and covered with plastic sheeting.
 - Complete a video survey of each well to assess the existing condition of each well.
 - Assess the condition of the mechanical and electrical systems, including pumps, motors, electrical systems, valves, and piping with consideration of the age and design life of the equipment.
 - Collect a water quality sample from as many as two select wells, to identify potential water quality conditions that could contribute to biofouling, screen plugging, steel corrosion concerns, and losses in well performance based on subtasks 9.3.1 and 9.3.2.
3. **Interference Drawdown Assessment:** Complete an assessment of interference drawdowns amongst wells based on the results of the performance tests using analytical tools. The interference drawdown assessment will be used to inform estimates of reliable capacity from the wellfield and develop design parameters for resizing pumps/motors and ancillary equipment, as needed.
4. **Condition Analysis Summary:** Compile data and observations and summarize conclusions regarding the wells, including structural condition, performance, capacity estimates, well

upgrade or replacement needs, individual and collective capacity assessments, pumping system design parameters (pumping rate, pump setting and assumptions).

SUBTASK 9.3.3 SOUTH WELLFIELD CONVEYANCE CONDITION ASSESSMENTS

The purpose of this subtask is to assess the existing South Wellfield force main conveyance system to determine the condition of the 24-inch diameter force main and pipe joints. A closed-circuit television (CCTV) contractor will be contracted to complete a video pipe inspection of the pipeline. McMillen's civil engineer will be on site with the CCTV contractor to oversee the CCTV inspection. The CCTV inspection will be summarized in a TM.

DELIVERABLES

- CCTV Video Files
- DRAFT CCTV Inspection Summary TM (Word and PDF format).
- FINAL CCTV Inspection Summary TM (Word and PDF format).

ASSUMPTIONS

- Disinfection of CCTV equipment will be according to the American Water Works Association (AWWA) C651.114. The procedure involves physically cleaning the CCTV and cable with soap, water and swabbing prior to disinfection. For disinfection soak, all equipment will be submerged in 100 parts per million (ppm) chlorine solution for 3 hours and then bagged for transit. Just prior to pipe inspection the equipment will be sprayed with a 1% chlorine solution and then rinsed with a non-pathogen potable water.
- The subcontractor can perform CCTV surveys as long as there is adequate access to insert the equipment into the pipes.

SUBTASK 9.4 STORMWATER INFILTRATION ASSESSMENT

This subtask includes evaluating the feasibility of infiltrating stormwater in the vicinity of the hatchery facility. This assessment will include three steps: 1) Design criteria and site screening, 2) characterization of preferred site, and 3) documentation of results and recommendations. The specific scope of work will include:

1. Design Criteria and Site Selection:

- Identify testing and design criteria, including identifying the area of the impervious surfaces that will contribute to the infiltration facility(ies), and potential need for any pretreatment (e.g., paved surfaces).

- Complete 6 to 8 shallow borings to the water table around the periphery of the facility to identify the locations and nature of favorable areas for infiltration testing. Soil handling and disposal will be in accordance with the Soil Management Plan (Subtask 9.1.1).

2. Characterization of Preferred Site

- Complete 1 to 2 borings to the water table to evaluate layering.
- Complete 3 to 5 test pits with a rubber-tire backhoe and run up to two infiltration tests. Soil management will be conducted in accordance with the Soil Management Plan (Subtask 9.1.1).

3. Documentation

- Document and evaluate the results and provide recommendations for Subtask 14.2 Site Stormwater Design Development.

DELIVERABLES

- DRAFT Groundwater Infiltration Results and Recommendations TM (Word and PDF format)
- FINAL Groundwater Infiltration Results and Recommendations TM (Word and PDF format)

SUBTASK 9.5 GROUNDWATER REHABILITATION SUMMARY REPORT

The purpose of this subtask is to collate and summarize the data and conclusions from Subtasks 9.1 through 9.3 in a report that will provide the basis for the presentation and assessment of groundwater source alternatives in Task 11. This subtask will include the preparing and submitting draft and final reports that will include the following:

1. Summary of the updated conceptual hydrogeologic model and implications for connectivity with the river, recharge of the shallow alluvial aquifer system on the north and south side of the river, the water quality, and potential uncertainties.
2. Summary of the analysis of hydraulic and water quality data from testing of potential riverbank filtration sites on the north side of the river, including:
 - The potential reliable capacity of a riverbank filtration source(s) including a collector well, horizontal well, and/or vertical well system(s) at favorable locations.
 - Baseline groundwater quality and water quality trends during pumping tests to assess potential raw water quality conditions from a riverbank filtration source.

- Potential hydraulic effects on the existing domestic supply well from a riverbank filtration source(s)
3. Summary of the condition of existing production wells in the South Wellfield and conclusions regarding the useful life of the wells and related systems, as well as parameters for design of improvements to inform the groundwater source alternatives discussion in Task 11.

DELIVERABLES

- DRAFT Groundwater Rehabilitation Study Report (Word and PDF format)
- FINAL Groundwater Rehabilitation Study Report (Word and PDF format)
- Report will be provided as an appendix to the Water Supply Alternatives Analysis (Task 11).

SUBTASK 9.6 GROUNDWATER ASSESSMENT WORKSHOPS

This subtask includes three four-hour workshops held at TPU's office in Tacoma, WA, at the conclusion of key milestones in the Groundwater Rehabilitation Study to discuss the results of the investigations. The final meeting will be held to discuss the overall assessment results upon submittal of the draft Groundwater Rehabilitation Report. The groundwater workshops in Tacoma, WA assumes two (2) days of travel and one four-hour meeting at TPU's offices. Up to seven (7) McMillen personnel and one (1) subconsultant will attend the meeting in Tacoma, WA.

DELIVERABLES

- DRAFT Groundwater Rehabilitation Study Agendas (Word and PDF format)
- FINAL Groundwater Rehabilitation Study Agendas (Word and PDF format)
- DRAFT Groundwater Rehabilitation Study Meeting Minutes (Word and PDF format)
- FINAL Groundwater Rehabilitation Study Meeting Minutes (Word and PDF format)

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 9.7 TEST DISCHARGE PERMITTING AND IMPLEMENTATION

The purpose of this subtask is to establish a reserve for permitting and implementation of measures to discharge water from aquifer testing in Subtask 9.2. This subtask would only be executed in the event that (1) a permit is required to discharge to the Cowlitz River and/or to alternative locations, or (2) special measures for conveying water from the test wells are needed, such as a road crossing and/or longer discharge piping runs than assumed for discharge to the river. This subtask includes the following work elements:

- Coordinate with Washington Department of Ecology (DOE) Water Quality Division to establish permit application requirements.
- Submit permit application and fee. A one-time permitting fee of \$5,000 is assumed for the application.
- Report discharge monitoring during testing.
- Construct one road crossing by trenching and installing pipe conduit and backfilling to grade.

ASSUMPTIONS

- Site Visits
 - Geophysical survey preparation, initial field inspection of existing test and observation wells, inspection and instrumentation of domestic supply well: two GSI staff.
 - Sample existing wells (1 - 2) for water quality analysis to inform water discharge alternatives: one GSI staff.
 - Test and observation well drilling preparation: well site selection, water discharge planning and work layout logistics planning: two GSI staff for one to two days.
 - Test and observation well drilling: rotation of two GSI staff for the duration of drilling and construction with periodic senior staff inspections.
 - South Wellfield inspection of electrical and mechanical equipment by McMillen electrical and mechanical engineers for two days on site.
 - McMillen's Civil Engineer will be onsite for up to one day during the CCTV inspection.
 - Pumping tests: rotation of two GSI staff with one senior staff visit. GSI staff onsite during daylight hours. Subcontracted pump tender personnel onsite full-time.
 - South Wellfield Condition Assessments: Rotation of two GSI staff during performance testing, well video and pumping equipment inspections.
- TPU has completed necessary preliminary evaluation for exploratory drilling on the north side of the river for cultural resource assessments on selected TPU properties per the Cowlitz Hydroelectric Cultural Resource Exclusion Form. For the purposes of this geotechnical evaluation, all areas within the Trout Hatchery complex have been archaeologically surveyed or disturbed to the point where they will likely not impact unidentified, potentially significant

cultural resources by the small diameter boring, thus the exclusion for the proposed action. An archaeological survey will occur later in the project when the APE is better defined for the larger impacts.

- TPU will provide and install level transmitters, if needed, at the domestic well, and McMillen will document drawdown effects from well testing areas.
- McMillen will notify TPU 10 days in advance of the test drilling efforts.
- Aquifer tests will be conducted at as many as four separate locations.
- As many as four temporary 8-inch diameter test wells will be drilled, completed, tested, and decommissioned, including two previously tested locations and two additional locations. The final number will depend on the suitability of existing wells for testing, and results of Subtask 9.1. Each test well is assumed to cost \$29,000, and each the aquifer testing at each site is assumed to cost between \$32,000 and \$50,000 exclusive of mobilization charges and depending on the duration of testing and water disposal requirements.
- As many as 12, 2-inch diameter monitoring wells will be completed, including as many as four permanent monitoring wells, depending on suitability and spatial distribution of existing wells. The number of wells will be determined based on consultation with Layne collector well experts, the presence and suitability of pre-existing observation wells and subsurface conditions at each test well location. It is assumed that each temporary observation well will cost approximately \$10,500 to \$14,500, depending on whether it is completed as a permanent installation or decommissioned, and assuming each is 40 feet deep.
- We anticipate the duration of the drilling and testing program to be 6 to 10 weeks, depending on actual drilling depths, unanticipated delays, and unforeseen circumstances.
- Soil cuttings from test and observation well borings (estimated at less than 10 cubic yards) and test borings and pits completed for infiltration testing (Subtask 9.4 – estimated approximately 15 to 20 cubic yards) will be contained in a roll off box or similar temporary container and disposed of offsite according to the Soil Management Plan (Subtask 9.2.1) and TPU soil testing and management requirements. Cuttings will be chemically characterized for disposal per Washington Department of Ecology guidelines and per the disposal site requirements.
 - We have assumed for the purposes of soil characterization and disposal that one composite sample will be analyzed and found eligible for disposal at a Subtitle D landfill.

- McMillen shall submit a proposed plan per Subtask 9.2.1 for disposal of groundwater generated during aquifer testing to include means and methods as well as water quality testing. The plan will be reviewed by TPU for conditions of approval and evaluate any permit requirements.
- McMillen will pay water quality and soil analytical fees. The analyte list for water quality testing during the riverbank filtration source investigation (Subtask 9.2) is assumed to consist of chemical analytical parameters for comparison to water quality standards for salmonid aquaculture and pathogens.
- Water Level Monitoring: A total of up to 10 temporary pressure transducer/data loggers and one barometric pressure sensor will be required and installed in the test wells, observation wells, and riverbed well points for groundwater level monitoring during the aquifer tests. Any permanent observation wells will be equipped with pressure transducers for long-term monitoring after aquifer testing is completed, Pressure transducers for permanent wells will require submittal approval by TPU.
- South Wellfield Wells: McMillen shall propose a plan and method to install any water level sensors and flow meters for South Wellfield wells. TPU will review prior to any operations with a two-week notice of and with the assistance of hatchery operations staff.
- The existing wells can be accessed with standard wheeled well workover rigs and support trucks. Advanced scheduling notice of (2 weeks) for gate access to the South Wells will be required to coordinate prior to notice to proceed McMillan shall field verify the suitability of access roads prior to contracting.
- TPU will designate a location for staging and storage of pumping equipment removed from the wells. Consultant will provide a map for mark up.
- Each well will be assessed individually and can be taken out of operation for a duration of not less than five days. The schedule for taking wells out of operation will be coordinated with TPU, TPU will coordinate with hatchery operations staff. The invasive work will be staged to avoid times of the year when the wells are being used. Each individual well assessment is assumed to cost approximately \$10,000 exclusive of mobilization charges.
- The pump contractor will visually inspect the pumping system equipment upon removal and will reinstall the original equipment upon approval of TPU.
- Hydraulic analysis of the existing groundwater system will be included in the study at a minimum of (2) seasonal times for full and low aquifers The hydraulic analysis of the proposed alternatives will be developed in the Water Supply Alternatives Analysis. McMillen shall pay for water quality and analytical fees.

TASK 10: CLIMATE CHANGE STUDY

SUBTASK 10.1 STREAMFLOW PROJECTIONS

Hydrologic projections, in the form of daily time series, are available from the University of Washington (UW) for unregulated flows of the Cowlitz River at different locations, including Mossyrock and Mayfield. However, the operation of Mossyrock dam and Mayfield dam causes modifications of seasonal flows at the hatchery location, including low summer flows. Given that the future risk of not meeting minimum flow requirements is of central interest in this project, projected regulated flows are desired.

Projected declines in low summer flows are anticipated due to a declining trend in snow accumulation and earlier snowmelt. If projected changes in low summer flows are relatively small, it may be adequate to consider the projected unregulated flows, making simple seasonal adjustments for obtaining regulated flows. But if projected changes to low summer flows are considerable, it is then advisable to simulate streamflow regulation to obtain the projected regulated flows.

It is our understanding that TPU is in the process of obtaining/developing streamflow projections for the Cowlitz River for use in this study. To support further climate change analysis tasks in this project, NHC requires the following data and data products from TPU, where the streamflow data referred to are inflows to the Cowlitz Project:

- Statistically adjusted historical and projected streamflow datasets
- Regulation-adjusted projected streamflow timeseries
- Low flow, high flow, and spring freshet flow threshold exceedance probabilities for future analysis periods, for example 2024-2043 and 2044-2063

NHC will coordinate with TPU regarding data transfer and review provided datasets to confirm that sufficient streamflow projections are available to proceed with further analysis discussed in Tasks 10.3 through 10.6. The budget for this Task 10.1 would be limited to time for coordination and review. To the extent that required data are not available from TPU on the timeline for this project, NHC can obtain or develop missing components, as discussed in optional Task 10.2.

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 10.2 STREAMFLOW PROJECTION DEVELOPMENT

If TPU is not able to provide streamflow projections as required by the timeline for this project, NHC will obtain and/or process Cowlitz River flow projections from the UW. For consistency

with other TPU projects, TPU will specify preferred projected dataset(s) and scenario(s) of greenhouse gas emissions used in other TPU projects. The UW offers four different projected datasets for each of the two scenarios of greenhouse gas emissions (RCP4.5 and RCP8.5), three using the Variable Infiltration Capacity (VIC) hydrologic model and a different dataset for historical flows (P1, P2 and P3), and one using the Precipitation Runoff Modelling System (PRMS) hydrologic model (with historical flows P1). Three of these 4 datasets include 10 global climate models (GCMs), and one uses three GCMs. If preferred TPU datasets have not yet been determined, NHC will work with TPU to determine which should be selected for this project.

Normally, the UW streamflow simulations for the historical period require statistical adjustment (season by season) to bring them to statistical agreement with local observations. Corresponding statistical adjustments are then made to the projected simulations as well, while taking into account that the dominant hydrological processes may change as a result of climate change. If TPU datasets have not yet been compared against observations and statistically adjusted, NHC will compare the UW simulated historical streamflow dataset against observations within the existing TPU projects and make any necessary statistical adjustments.

If TPU has not developed regulated projected streamflows to be available for this project, NHC will provide the unregulated streamflows to TPU to run through their operations model to provide regulated future flow projections for this project. If not provided by TPU, NHC will determine the distribution of projected daily stream flows in the Cowlitz near the hatchery, for each season, from the projected regulated flows. The probabilities of low flows during summer/fall and high flows during the fall/winter and during the spring freshet will be calculated for the next 20 years (2024-2043) and for the subsequent 20 years after (2044-2063). The current FERC Project license expires in 2038. Instream flow requirements associated with a license extension will likely differ from present requirements. While those new requirements are not yet known, plausible hypothetical values will be used. For summer/fall low flows, the likelihood that in any given year daily regulated flows will be lower than specified threshold values of interest to the hatchery will be calculated. For peak flows, the likelihood that in any given year daily regulated flows will be higher than specified high thresholds will be calculated.

SUBTASK 10.3 WATER TEMPERATURE PROJECTIONS

When streamflows are low, stream water temperature tends to respond to air temperature and may become significantly elevated on hot days. Water temperature projections for the past ten (10) years will be based on relationships between water temperature and air temperature. Tacoma Power has already supplied water temperature observations to our team, which will be used to determine site-specific seasonal correlations between air and water temperature, and how those correlations vary for different stream flows. These relationships will then be applied

to the air temperature projections from the same global climate models as used for stream flows and conditioned on projected stream flows.

For well water, once water temperature monitoring data is available from this project (Task 9), a methodology similar to that used for stream water may be possible to use depending on the length of data that can be collected within this project in a timely manner. If the length of data is insufficient, then the assumption will be made that future temperature of shallow groundwater will be higher than present temperature by the same amount as the projected warming for mean annual air temperature.

SUBTASK 10.4 NORTH WELLS, SOUTH WELLS, AND DOMESTIC WATER LEVEL PROJECTIONS AND TEMPERATURE PROJECTIONS

Historical groundwater studies have determined that well water levels of the south wells are recharged by local precipitation. In this project (Task 9), GSI Water Solutions may determine the influence of stream water levels on well levels. Depending on GSI's findings, NHC will provide local hydrologic projections to GSI to develop water level projections for different seasons. This will be done for the north wells, south wells, and domestic wells.

An empirical model describing how well water temperature varies with stream water temperature, air temperature, and streamflow will be developed based on observations of these variables, including observational data obtained by GSI in the course of this project.

SUBTASK 10.5 OBSERVED TRENDS

NHC will assess available long-term records of water temperature (last ten (10) years if TPU data provided), air temperature, precipitation, and water level in wells, to identify and quantify significant trends over time. NHC has received the locally collected temperature and rainfall data from TPU. However, to observe long term trends additional measurements of air temperature and precipitation. Sources of this data will be agreed upon as part of Task 6 Basis of Design. This could include sources such as from potential nearby meteorological stations and, if necessary, will be supplemented by publicly available gridded time series of observations-based meteorological data¹.

¹ The Livneh data set is available from <https://downloads.psl.noaa.gov/Datasets/livneh/metvars/> and is described in <https://psl.noaa.gov/data/gridded/data.livneh.html>

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 10.6 OBSERVED TRENDS OF PEAK FLOWS AND LOW SUMMER FLOWS IN THE COWLITZ RIVER

NHC will assess available long-term records of peak flows and low summer flows in the Cowlitz River to identify and quantify any significant trends over time.

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 10.7 WILDFIRE RISK

Increasingly hot, dry, and more prolonged summers lead to increased wildfire risk in many areas of Washington State. A high-level assessment of future wildfire risk at the hatchery site will be conducted, considering location and surroundings. In addition to the risk that fire poses to facilities, it has the effect of reducing soil permeability, promoting higher runoff peaks which impact water quality, and potentially affecting groundwater recharge.

This task consists of summarizing information on future wildfire risk and fire danger days made available through the UW's Climate Mapping Tool². The risk of fire in the recent past can also be summarized based on the LandFire database³.

SUBTASK 10.8 CLIMATE CHANGE WORKSHOP

A four-hour virtual workshop will be held between the McMillen Team and TPU to discuss the DRAFT Climate Change Evaluation Report.

DELIVERABLES

- Climate Change Workshop Meeting Agenda (Word and PDF format).
- Climate Change Workshop Meeting Minutes (Word and PDF format).

ASSUMPTIONS

- Meeting materials will be provided to TPU one month prior to the scheduled meeting.

SUBTASK 10.9 CLIMATE CHANGE EVALUATION REPORT

A technical report will be prepared summarizing results and describing the methodology used in the analyses.

DELIVERABLES

- DRAFT Climate Change Evaluation Report (Word and PDF format)

² <https://data.cig.uw.edu/climatemapping/>

³ <https://landfire.gov/fireregime.php>

- FINAL Climate Change Evaluation Report (Word and PDF format)
- The Climate Change Evaluation Report will be provided as an appendix to the Water Supply Alternatives Analysis Report.

ASSUMPTIONS

- NHC will attend the Climate Change Workshop.
- Based upon the Project schedule, Year 1 Rates (2024) will be used for budgeting purposes.

TASK 11 WATER SUPPLY ALTERNATIVES ANALYSIS

The first step in developing the design criteria for the Cowlitz Trout Hatchery is to understand the hatchery production goals through an assessment of the hatchery bioprogram (Task 7). The bioprogram models the flow and space required for the facility to meet the hatchery production goals. Once McMillen understands the water required to meet the production goals from the bioprogram, an assessment of the groundwater resources for the facility will be completed. The water resources assessment will include determination of the viability of groundwater resources (Task 9). Based upon the determination of the groundwater supply study and the climate change impacts to the water supply sources, the surface water supply and treatment (Task 8) will be assessed for increased capacity, if needed. The McMillen Team will develop individual reports for the following items in Tasks 7, 8, 9, 10, and 12. The information compiled within the reports will be summarized in the Water Supply Alternatives Analysis Report and, additionally, each individual report will be provided as an appendix to the Water Supply Alternatives Analysis Report (Subtask 11.4).

SUBTASK 11.1 SURFACE WATER INTAKE AND OZONE TREATMENT ALTERNATIVES

The SOW associated with the intake will include development of alternatives identified in Task 8 Ozone Treatment Facility Study to modify and upgrade the existing intake, pumpstation, and ozone treatment facility to meet the hatchery water supply demand as determined in the bioprogram (Task 7) and groundwater rehabilitation study (Task 9). Per the PG23-0211F RFQ/P as advertised 2023, McMillen will develop alternatives that will meet the following:

- No change today, increase in the long-range future.
- Increase capacity today with this program project.
- Provide interim system plans for future increase.

Specific items that will be assessed for alternative development include:

- Intake screens—determine alternatives that meet the required upgrades to be National Oceanic and Atmospheric Administration (NOAA) screen criteria compliant.
- Generator, variable frequency drives (VFDs) supply pumps, piping, bypass piping, valves, flow meters, and gates upon the surface water demand outlined in the bioprogram (Task 7) and determined after the viability of groundwater resources (Task 9).
- Assessment of operational and maintenance (O&M) design alternatives to accommodate a new intake design (i.e., screen cleaning system, access, jib crane, debris boom, etc.).
- Assessment if any ozone treatment upgrades are required based on the groundwater study, or/as required, to meet the bioprogram flow demands for the hatchery facility.

SUBTASK 11.2 GROUNDWATER ALTERNATIVE DEVELOPMENT – WELL SYSTEM AND CONVEYANCE

Based upon the analysis and results of the Groundwater Rehabilitation Study (Task 9) McMillen will evaluate the required alternatives to upgrade the existing groundwater facility mechanical, electrical, and SCADA controls and distribution systems, as necessary. Additionally, McMillen will develop alternatives to assess the potential for development of supply capacity from a collector well, horizontal well(s), or vertical wells near the river to meet the overall bioprogram needs summarized in the Bioprogram Report. Based upon groundwater flow potential, options for using groundwater at varying life stages (i.e., incubation, outdoor circulars, etc.) will be investigated.

SOUTH WELLFIELD ALTERNATIVES

For the South Wellfield, McMillen will develop alternatives that may include installing new wells, or smaller diameter pumps at the bottom of wells to maximize available drawdown, and potential upgrades for improving efficiency of operations and potentially well operations (i.e., VFDs). Additionally, well system distribution system alternatives will be developed to address potential water losses between wells and hatchery facilities based upon required flow demands determined in the bioprogram. This may include reusing existing piping if appropriate, or slip lining the existing pipelines.

NORTH WELLFIELD RIVERBANK FILTRATION SOURCE ALTERNATIVES

McMillen will assess the potential to develop a collector well, horizontal well(s), and/or vertical well systems alternatives to utilize riverbank filtration to capture water from the Cowlitz River. The assessment will include an evaluation of potential favorable sites for collector well-type or vertical well systems, including capacity estimates, water quality conditions, mechanical and electrical needs, controls, distribution system requirements, and planning level cost estimates.

SUBTASK 11.3 HEAD TANK ALTERNATIVES

This subtask develops design of alternatives for a new biosecured head tank to meet the hatchery water supply demand as determined in the bioprogram. Specific items that will be assessed include the need for a multi-chamber head tank for treated and untreated surface water, gas balance, the need for ultraviolet (UV) treatment, and a determination of the need for a separate groundwater head tank.

SUBTASK 11.4 WATER SUPPLY ALTERNATIVES ANALYSIS REPORT

After completion of the bioprogram and water supply analysis, McMillen with close coordination with TPU will develop Water Supply Alternatives Analysis Report that will outline an effective approach and illustrative tools to ensure a clear, concise evaluation of the Project water supply alternatives. Establishing clear design criteria and objectives at the initiation of the study effort provides a solid foundation for developing feasible water supply alternatives as well as measuring the effectiveness of the alternative in meeting TPU's Program objectives.

It will be important to weigh the alternatives based upon fish health, total capital costs, life cycle costs, constructability, the ability to meet hatchery production goals throughout construction, mitigate climate impacts, operation and maintenance (O&M), and impacts to the environment during and post construction. The multi-faceted evaluation criteria ensure that the proposed alternative does not have any potential fatal flaws that could eliminate the alternative from being implemented. Specific criteria will be initially developed by McMillen and these criteria will be updated based upon direct coordination with TPU in a workshop (see Subtask 11.5).

DELIVERABLES

- DRAFT Water Supply Alternative Analysis Report (Word and PDF format)
- FINAL Water Supply Alternative Analysis Report (Word and PDF format)

ASSUMPTIONS

- A total of 12 drawings will be developed to a 5% design level to support construction cost estimates for the water supply alternatives analysis. These drawings will be provided as an appendix to the Water Supply Alternatives Analysis Report.
- Hydraulic analysis will be completed for each water supply alternative developed using EPANet Software. The hydraulic analysis for each alternative will be provided as an appendix to the Water Supply Alternatives Analysis Report.
- The surface water alternative analysis will focus on the water supply system from the surface water intake to the water supply head tank.

- The groundwater alternative analysis will focus on the water supply system from the South Wellfield well system to the water supply head tank, and a potential new North Wellfield source to the water supply head tank.
- The alternatives analysis will include benefit-cost analysis versus fish health.
- The analysis will include near term and long-term construction sequencing, O&M, and risks.
- The American Association of Cost Engineering (AACE) provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.
- The recommended alternative from the Water Supply Alternatives Analysis will be integrated into the Master Hydrology & Hydraulic Report (Task 14).
- The recommended alternative from the Water Supply Alternatives Analysis will be developed to a 10% design level in the 10% Plans (Task 15).
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 11.5 WATER SUPPLY ALTERNATIVE ANALYSIS WORKSHOPS

Three, 8-hour workshops will be held at the Salmon Hatchery Conference Room in Salkum, WA. The meetings will be held between the McMillen Team and TPU SMEs throughout the Water Supply Alternatives Analysis development. McMillen's PM will set the meeting agenda and will coordinate the logistics for each meeting. The Water Supply Alternative Analysis meetings in Salkum, WA assumes two (2) days of travel and one (1) full day on site at the hatchery facility (up to 8 hours). Up to ten (10) McMillen personnel and two (2) subconsultants will attend the meeting in Salkum, WA. The three workshops will be as follows:

- Workshop No. 01 – Development of Water Supply Analysis alternatives. The purpose of this meeting is to agree on alternatives that will be evaluated. The water supply alternatives will be developed initially by McMillen, reviewed by TPU, and then reviewed between McMillen and TPU SMEs during the meeting. The meeting will be documented in the meeting minutes. The water supply alternatives will need to be reviewed and agreed to by TPU to provide an efficient and effective path forward for the water supply alternatives analysis. This will allow proper evaluation of determining the preferred water supply alternative for the Cowlitz Trout Hatchery.

- Workshop No. 02 (Lead by TPU and Supported by McMillen) – WDFW Current Operator Coordination. The purpose of this meeting is to discuss the water supply alternatives with by TPU to gain current operator input on the Water Supply Alternatives analysis. TPU will lead this workshop with McMillen support.
- Workshop No. 03 – Development of Water Supply Analysis matrix evaluation criteria and weighting: The purpose of this meeting is to agree on the matrix evaluation criteria that each alternative will be evaluated. The matrix evaluation criteria will be developed initially by McMillen, reviewed by TPU, and then reviewed between McMillen and TPU SMEs during the meeting. The meeting will be documented in the meeting minutes. The matrix evaluation criteria will need to be reviewed and agreed to by TPU to provide an efficient and effective means of evaluating each water supply alternative. This will allow proper evaluation of determining the preferred water supply alternative for the Cowlitz Trout Hatchery.
- Workshop No. 04 – Water Supply Alternatives Analysis Report Review: The purpose of this meeting is to go through the Water Supply Alternative Analysis Report in detail. This includes the step-by-step review of inputs to the evaluation matrix. The meeting will be documented in the meeting minutes. The goal of the meeting will be to come to an agreement on the preferred water supply alternative to carry forward into the 10% design.

DELIVERABLES

- DRAFT Meeting Agendas (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format)
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

TASK 12: WATER RIGHTS ANALYSIS

SUBTASK 12.1 WATER RIGHTS ANALYSIS SUMMARY

TPU has already completed an assessment of their water rights at the CTH facility. The purpose of this task is to assess if TPU will be required to transfer water rights of their existing water rights based upon the flow requirements determined in the updated bioprogram for the

facility. No new water rights will likely be requested. The current water rights for the facility include:

- Cowlitz River 56 ft³/sec
- South Wells 10.8 ft³/sec
- North Wells 2.3 ft³/sec (1.9 for Hatchery & 0.4 for Domestic Well (860 GPM))
- Blue Creek 18.0 ft³/sec

Note that there is also a 3 cfs surface water right for Blue Creek for “fish farm ponds” issued to the Department of Fisheries with a priority date of May 27, 1958. This WR is considered active but perhaps there is potential for us to take ownership of this and transfer to a groundwater right since it does not appear this is being appropriated. Assumptions include this potential would need TPU to reach out to WDFW.

McMillen will provide a TM summarizing the recommendations for the facility and the potential impact that it may have on the facility’s water rights.

DELIVERABLES

- DRAFT Water Rights TM (Word and PDF format)
- FINAL Water Rights TM (Word PDF format)

ASSUMPTIONS

- TPU is solely responsible for working on any new or transferred water rights.
- TPU review periods will be 10 business days, unless noted otherwise.
- One 2-hour virtual meeting with TPU (Maryanne & Matt P.).
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

MANAGEMENT RESERVE FUND FOR OPTIONAL SUBTASK 12.1 WATER RIGHTS SUPPORT

The purpose of this optional subtask is to provide assistance, as needed, to support TPU on water rights matters.

ASSUMPTIONS

- This subtask assumes 40 hours for the Project Manager and 40 hours for the Civil Design Lead.

TASK 13: HATCHERY FACILITY ALTERNATIVES ANALYSIS

Within this work task, alternatives will be developed and evaluated for the Project based on design criteria and the water supply outlined in previous task. The focus of this evaluation is to develop a recommended site layout for the Project that could be implemented based upon the proposed bioprogram (current fish program):

- 308,500 Lower Cowlitz winter steelhead reared to 7 fish per pound (fpp), released on-station.
- 100,000 Tilton winter steelhead reared to 7 fpp, released on-station.
- 236,000 Upper Cowlitz winter steelhead reared to 7 fpp released on-station
- 650,000 summer steelhead reared to 5.5 fpp released on- station.
- 110,000 sea-run cutthroat trout reared to 4 fpp released on-station.

The McMillen team will evaluate the hatchery for upgrades, modifications, or complete re-construction to meet production requirements outlined in the Biological Design Criteria Report (Task 7).

SUBTASK 13.1 INCUBATION FACILITY ANALYSIS

The purpose of this subtask is to incorporate recommended incubation rearing volumes and flow rates developed from the Biological Design Criteria Report and upgrades to the water conveyance system from the head tank to the incubation facility. McMillen will review the below recommendations from the 2018 Master Plan and will determine qualified alternatives for the Incubation Facility with close coordination with TPU:

- Isolation rooms for incubation.
- (3) Isolation areas in tank room.
- Curtains to separate isolation areas.
- Determine need for chilled water system.
- 500 gpm delta T of 4 degrees F.
- Water channeled through head troughs above rearing units.
- Provide ozonated river water to the building as an emergency water supply.

- Provide provisions to disinfect the groundwater, if needed, in the future.
- A combination of heath stacks and bulk incubators for flexibility.
- Deep troughs of varying size and/or with divisibility.
- Provide proper floor slope and drainage to keep working surface as dry as possible.
- Provide drains out of trough floors.

DELIVERABLES

- DRAFT Incubation Alternatives TM (Word and PDF format)
- FINAL Incubation Alternatives TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- A total of three (3) drawings will be developed to support construction cost estimates for the incubation alternatives analysis. McMillen will provide design drawings for up to three (3) alternatives at the 5 percent design level to aid in coordination and selection of the final alternative.
- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- This subtask assumes two four-hour virtual coordination meetings with TPU.
- Hydraulic analysis will be completed for each incubation alternative developed.
- The SOW assumes the design of new yard piping to and from each hatchery facility (i.e., incubation, early rearing, outdoor rearing, adult holding ponds, etc.) that meet the bioprogram needs. The existing yard piping is assumed to be beyond its useful life.
- The analysis will reassess previous work and the selected alternative from the 2018 Cowlitz Trout Hatchery Master Plan.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class

5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.

- The Incubation Alternatives TM will be provided as an appendix to the Hatchery Facility Alternatives Analysis Summary Report.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.2 OUTDOOR EARLY REARING SYSTEM ANALYSIS

The purpose of this subtask is to incorporate recommended outdoor early rearing volumes and flow rates developed from the Biological Design Criteria Report and upgrades to the water conveyance system, as required. McMillen will evaluate the following alternatives with close coordination with TPU:

- Circular Tank Farm (Recirculation Aquaculture Systems [RAS], Partial Reuse Aquaculture System [PRAS], Airlift, Serial Reuse with Oxygen, etc.):

Additionally, McMillen will review the recommendations from the 2018 Master Plan as follows:

- Incubation Room: Re-assessment.
- Re-evaluate entire system and zones.
- Dedicate re-use lines in Hydraulic Report.
- F-Series would be replaced by thirty-two 8-foot-diameter fiberglass tanks (Zone 1).
- A-Series would be replaced by thirty-two 16-foot-diameter fiberglass tanks (Zone 1).
- B-Series would be replaced by twenty-four 20-foot-diameter fiberglass tanks (Zone 2).
- C-Series would not be needed and can be demolished.
- Eight (8) 16-foot-diameter tanks would receive first-pass treated surface water (Zone 1).
- Zone 2 would receive first-pass water from the addition of the new ozone plant.
- Sixteen (16) 20-foot diameter tanks would be plumbed with fish release piping to the monitor and evaluation transfer facility.

DELIVERABLES

- DRAFT Outdoor Early Rearing Alternatives TM (Word and PDF format)
- FINAL Outdoor Early Rearing Alternatives TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- A total of twelve (12) drawings will be developed to support construction cost estimates for the outdoor rearing alternatives analysis. McMillen will provide design drawings for up to three (3) alternatives at the 5 percent design level to aid in coordination and selection of the final alternative.
- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- This task assumes two four-hour virtual coordination meetings with TPU.
- Hydraulic analysis will be completed for each incubation alternative developed.
- The SOW assumes the design of new yard piping to and from each hatchery facility (i.e., incubation, early rearing, outdoor rearing, adult holding ponds, etc.) that meet the bioprogram needs. The existing yard piping is assumed to be beyond its useful life.
- The analysis will reassess previous work and the selected alternative from the 2018 Cowlitz Trout Hatchery Master Plan.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.
- The Outdoor Early Rearing Alternatives TM will be provided as an appendix to the Hatchery Facility Alternatives Analysis Summary Report.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.3 FACILITY FISH TRANSFER (MONITOR & EVALUATION)

Currently fish are transferred from the incubation/trough room to the F-Series raceways, from the F-Series raceways to the A-, B-, and C-Series raceways, and from the A-, B-, and C-Series raceways to the rearing lake by hand (or pumped). This is an inefficient labor-intensive process and requires a lot of manpower to accomplish. Additionally, this process causes undue stress on the fish, making them susceptible to disease and ultimately increased mortality.

The purpose of this subtask is to review the operation and submit alternatives for a plan to transport the fish through the facility. This includes a plan to move fish from the point of incubation to release for future normal operations and operations during construction.

1. Update current operations of the facility.
2. Provide interim operations during construction activities for (Monitor/Evaluation)

Additionally, McMillen will review the recommendations to the fish transfer systems from the 2018 Master Plan as follows:

- Early rearing troughs in the incubation room would be fitted with Cam-Lok type fittings to allow water-to-water transfer of fish to the 8-foot diameter fiberglass rearing tanks.
- The 8-foot-diameter fiberglass rearing tanks would be fitted with inlet and outlet CamLok type fitting to allow water-to-water transfer of fish to the 16- and 20-foot-diameter fiberglass tanks.
- The 16- and 20-foot-diameter fiberglass tank would be fitted with inlet Cam-lok type fitting to accept water-to-water transfer of fish from the 8-foot-diameter fiberglass tanks.
- The 16- and 20-foot-diameter fiberglass tank would incorporate a secondary fish release side box drain, which would allow water-to-water transfer from the tanks to the monitoring and evaluation fish transfer station.
- Elevation of the 8-, 16-, and 20-foot tanks would be set to allow for gravity transfer of fish.
- The monitoring and evaluation fish transfer station can be gravity-fed or pumped to rearing lakes.
- Tagging trailer hook-ups at the monitoring and evaluation facility.

- The benefits for these modifications include decreased labor needs to transfer fish, increased biosecurity, and less stress on induced on fish.

DELIVERABLES

- DRAFT Fish Transfer Alternatives TM (Word and PDF format)
- FINAL Fish Transfer Alternatives TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- A total of nine (9) drawings will be developed to support construction cost estimates for the fish transfer alternatives analysis. McMillen will provide design drawings for up to three (3) alternatives at the 5 percent design level to aid in coordination and selection of the final alternative.
- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- Hydraulic analysis will be completed for each incubation alternative developed.
- This task assumes two four-hour virtual coordination meetings with TPU.
- The SOW assumes the design of new yard piping to and from each hatchery facility (i.e., incubation, early rearing, outdoor rearing, adult holding ponds, etc.) that meet the bioprogram needs. The existing yard piping is assumed to be beyond its useful life.
- The analysis will reassess previous work and the selected alternative from the 2018 Cowlitz Trout Hatchery Master Plan.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.
- The Fish Transfer Alternatives TM will be provided as an appendix to the Hatchery Facility Alternatives Analysis Summary Report.

- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.4 REARING POND AND POLLUTION ABATEMENT POND ANALYSIS

The purpose of this subtask is to analyze the assumptions, decisions, and recommendations of the 2018 Master Plan. There are three (3) 5-acre ponds, one (1) 3-acre pond, and an abatement pond. The existing pollution abatement pond currently leaks and is in need of redesign and repair. Because of the pollution abatement pond's proximity to Rearing Pond 4, the pollution abatement pond and Rearing Pond 4 are proposed to be constructed first based upon the final construction phasing plan. The Rearing Pond and Pollution Abatement Pond modifications proposed in the 2018 Master Plan include the following:

- The redesigned pollution abatement pond would be smaller than the existing pollution abatement pond, allowing an increased area (up to 3 acres) for the modifications to replace Pond 4.
- Three 1-acre trapezoidal ponds could be installed to replace Pond 4.
- The new ponds would be designed for either first pass or serial reuse of water. Water would flow from the upstream pond to the second pond and then from the second pond to the third.
- If there is sufficient hydraulic gradient from the upstream to the downstream pond, low head oxygenators could be provided between the ponds for water aeration. The pond design is required to address outflow elevation issues with the Cowlitz River and Blue Creek.
- The new ponds would be lined to prevent leakage and seepage.
- A bird predation prevention and shading system should be provided for each pond.
- Each pond would have an outlet kettle that allows for fish release to an outlet channel or pipe.
- Each pond would have an outlet structure that was capable of regulating the pond depth at no less than 1 ft intervals from full to empty. Outlets would allow for fish-friendly releases that could be performed by a single individual.

Under this subtask McMillen will revisit the assumptions for all ponds from the 2018 Master plan and will develop alternatives with direct coordination with TPU staff that will address the following:

- A predation prevention plan.
- Pond segregation at full build-out (assess phasing and construction interim plans).
- Active rotating screens, outlet/inlet-docks, trams, enclosed, fencing, nets to fence, kettles to whole pond send waste to kettle area.
- Waste management plan that could include divers.
- Improvements to release channel.
- Need to answer the question of whether to increase pond elevations or provide emergency bypass pumps.
- Staff prefer the ability to remove insert fish counters, staff does not need all ponds at once. Can do (2) fish counters total and move. Entire system needs evaluation by a biologist.

DELIVERABLES

- DRAFT Rearing Pond and Pollution Abatement Pond Alternatives TM (Word and PDF format)
- FINAL Rearing Pond and Pollution Abatement Pond Alternatives TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- A total of three (3) drawings will be developed to support construction cost estimates for the rearing pond and abatement alternatives analysis. McMillen will provide design drawings for up to three (3) alternatives at the 5 percent design level to aid in coordination and selection of the final alternative.
- Civil 3D models will be developed for the CTH site.

- This subtask includes two four-hour virtual coordination meetings with TPU staff.
- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- Hydraulic analysis will be completed for each pond alternative developed.
- The SOW assumes the design of new yard piping to and from each hatchery facility (i.e., incubation, early rearing, outdoor rearing, adult holding ponds, etc.) that meet the bioprogram needs. The existing yard piping is assumed to be beyond its useful life.
- The analysis will reassess previous work and the selected alternative from the 2018 Cowlitz Trout Hatchery Master Plan.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.
- The Rearing Pond and Abatement Pond Alternatives TM will be provided as an appendix to the Hatchery Facility Alternatives Analysis Summary Report.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.5 OUTLET STRUCTURE ANALYSIS

This subtask includes developing outlet structure alternatives with close coordination with TPU staff. Currently there are two (2) existing outfall locations off the adult rearing and abatement ponds. TPU will partner with WDFW as current operators of the hatchery. The current hatchery outlet configuration allows the site to drain to Blue Creek and to the Cowlitz River. The current concern with Blue Creek is the need for ongoing and future dredging for flood impacts. And currently, the Cowlitz River has back flow issues with the gravity outfall system during seasonal high water. The purpose of the task is to provide a feasible routing of all outfall water to the Cowlitz River instead of Blue Creek. Lewis County has a tie in improvement project planned up stream of the Hatchery Project location. The goal of the alternatives should be to promote effective passive effluent systems and return clean water to receiving water. The alternatives developed for the outlet structure(s) will need to satisfy the concern of relocating the ADA fishing location, and the decant water from the pollution abatement pond would be directed to the existing Cowlitz River outfall.

DELIVERABLES

- DRAFT Outlet Structure Alternatives TM (Word and PDF format)
- FINAL Outlet Structure Alternatives TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- A total of three (3) drawings will be developed to support construction cost estimates for the outlet structure alternatives analysis. McMillen will provide design drawings for up to three (3) alternatives at the 5 percent design level to aid in coordination and selection of the final alternative.
- Civil 3D models will be developed for the CTH site and for hatchery staff training and operations and maintenance.
- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- This subtask includes two four-hour virtual coordination meetings with TPU staff.
- Meeting materials need to be provided one month in advance to TPU of workshops intended for coordination with WDFW.
- Hydraulic analysis will be completed for each incubation alternative developed.
- The SOW assumes the design of new yard piping to and from each hatchery facility (i.e., incubation, early rearing, outdoor rearing, adult holding ponds, etc.) that meet the bioprogram needs. The existing yard piping is assumed to be beyond its useful life.
- The analysis will reassess previous work and the selected alternative from the 2018 Cowlitz Trout Hatchery Master Plan.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.

- The Outlet Structure Alternatives TM will be provided as an appendix to the Hatchery Facility Summary Alternatives Analysis Report.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.6 HATCHERY BUILDING ANALYSIS

The purpose of this subtask is to review the 2018 Master Plan recommended upgrades to the existing hatchery office building. The Consultant role will provide a Technical Memorandum justifying upgrades vs. new building with a location cohesive with total site operations. This is a cost/benefit of New vs. Remodel which includes the following:

- Site the new location in the master circulation plan.
- Assume an implantation cost for a (10) ten-year horizon.
- Include all ADA from parking and entrance throughout the building.

DELIVERABLES

- DRAFT Hatchery Building TM (Word and PDF format)
- FINAL Hatchery Building TM (Word and PDF format)
- DRAFT Meeting Agendas (Word and PDF format).
- FINAL Meeting Agendas (Word and PDF format)
- DRAFT Meeting Minutes (Word and PDF format).
- FINAL Meeting Minutes (Word and PDF format)

ASSUMPTIONS

- The architectural design will include concept level design that assumes up to two (2) concepts for a new facility—one in existing location and one in alternate location, and up to two (2) concepts for a remodeled facility.
- Civil 3D models will be developed for the CTH site.
- This subtask includes two four-hour virtual coordination meetings with TPU staff.
- Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- The Hatchery Building TM will be provided as an appendix to the Hatchery Facility Alternatives Analysis Summary Report.

- TPU review periods will be 10 business days, unless noted otherwise.

SUBTASK 13.7 HATCHERY FACILITY ALTERNATIVES ANALYSIS SUMMARY REPORT

Layouts of the concept alternatives will be developed in AutoCAD to illustrate each proposed modification, upgrade, or re-construction at the hatchery. Biological risks associated with each alternative that will mitigate climate change will be identified and addressed as part of the alternative's development. The alternatives will take into consideration fish husbandry techniques and ease of operation. This includes temperature control to reduce overall fish stress and pathogens thereby reducing the need for therapeutants for fish health issues.

McMillen will develop an effective approach and illustrative tools to ensure a clear, concise evaluation of the Project alternatives. Establishing clear design criteria and objectives at the initiation of the study effort provides a solid foundation for developing feasible alternatives as well as measuring the effectiveness of the alternative in meeting TPU's Project objectives. It will be important to weight the alternatives based upon total capital costs, constructability, the ability to meet hatchery production goals throughout construction, mitigation of climate impacts, operation, and maintenance to ensure the systems are straight forward and easy to operate and maintain and impacts to the environment during and post construction. The multi-faceted evaluation criteria ensure that the proposed alternative does not have any potential fatal flaws that could eliminate the alternative from being implemented.

McMillen will then present the alternatives at a series of Hatchery Facility Analysis Workshops with TPU allowing an in-depth discussion and understanding of the proposed alternatives and evaluation criteria. McMillen will work with TPU during the workshops to rank each alternative. After the first three workshops, an initial draft of the Water Supply Alternatives Analysis Report will be prepared and submitted to TPU for review and comment. McMillen will then present the findings of the alternatives analysis report at Hatchery Facility Alternatives Analysis Workshop with TPU allowing an in-depth discussion and understanding of the proposed alternatives with the goal of selecting the alternative to be carried to 10% design. The focus of this evaluation will be to develop a hatchery layout which will reduce costs while improving operation and fish production efficiency. The McMillen team will also assess how each alternative could be implemented and constructed while maintaining production at the facility to the greatest extents possible.

DELIVERABLES

- DRAFT Alternative Analysis Report (Word and PDF format)
- FINAL Alternative Analysis Report (Word and PDF format)

ASSUMPTIONS

- Alternative Analysis shall include Benefit/Cost vs. Fish Health. Benefit/Cost shall include near term and long-term construction, operations, and maintenance for a useful life to be determined by the Consultant, as well as risks.
- The AACE provides guidelines for development of cost estimates for various levels of project definition. To aid in the alternatives analysis, a Class 5 estimate will be prepared at the ~5% design level of Project definition as defined by the AACE. Typical accuracy ranges for Class 5 estimates are -50% to -20% on the low side, and +30% to +100% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

SUBTASK 13.8 HATCHERY ALTERNATIVE ANALYSIS WORKSHOP AT TPU

Workshop No. 01 – Development of Hatchery Facility Alternatives. The purpose of this meeting is to agree on alternatives that will be evaluated. The hatchery facility alternatives will be developed initially by McMillen, reviewed by TPU, and then reviewed between McMillen and TPU SMEs during the meeting. The meeting will be documented in the meeting minutes. The hatchery facility alternatives will need to be reviewed and agreed to by TPU to provide an efficient and effective path forward for the hatchery alternatives analysis. This will allow proper evaluation of determining the preferred water supply alternative for the Cowlitz Trout Hatchery.

This subtask includes one (1) four-hour meeting at the TPU office in Tacoma, WA. The TPU Meeting in Tacoma, WA assumes two (2) days of travel and one four-hour meeting at TPU's offices. Up to six (6) McMillen personnel will attend the meeting in Tacoma, WA.

SUBTASK 13.9 WDFW CURRENT OPERATORS' COORDINATION MEETING AT CTH

Workshop No. 02 (TPU lead McMillen Support) – WDFW Coordination Meeting. The purpose of this meeting is to coordinate the hatchery facility alternatives with WDFW to gain current operators' perspective.

This subtask includes one (1) four-hour meeting at the Salmon Hatchery facility conference room in Salkum, WA, with discipline specific TPU subject matter experts (SMEs). This meeting will include a four-hour site visit for team members. This meeting will include a four-hour meeting and then a four-hour site visit for team members. This assumes two (2) days of travel and one (1) full day on site at the hatchery facility (up to 8 hours). Up to ten (10) McMillen personnel will attend the meeting and site visit in Salkum, WA.

SUBTASK 13.10 HATCHERY ALTERNATIVES ANALYSIS WORKSHOP AT COWLITZ TROUT HATCHERY

Workshop No. 03 – Development of Hatchery Facility Analysis matrix evaluation criteria and weighting: The purpose of this meeting is to agree on the matrix evaluation criteria that each alternative will be evaluated. The matrix evaluation criteria will be developed initially by McMillen, reviewed by TPU, and then reviewed between McMillen and TPU SMEs during the meeting. The meeting will be documented in the meeting minutes. The matrix evaluation criteria will need to be reviewed and agreed to by TPU to provide an efficient and effective means of evaluating each hatchery facility alternative. This will allow proper evaluation of determining the preferred water supply alternative for the Cowlitz Trout Hatchery.

This subtask includes one (1) four-hour meeting at the Salmon Hatchery facility conference in Salkum, WA, with discipline specific TPU subject matter experts (SMEs). This meeting will include a four-hour site visit for team members. This meeting will include a four-hour meeting and then a four-hour site visit for team members. This assumes two (2) days of travel and one (1) full day on site at the hatchery facility (up to 8 hours). Up to ten (10) McMillen personnel will attend the meeting and site visit in Salkum, WA.

SUBTASK 13.11 HATCHERY ALTERNATIVES ANALYSIS VIRTUAL MEETINGS

Workshops No. 04 and No. 05: Two (2) Virtual Meetings for the Hatchery Facility Alternatives Analysis Report Review. The purpose of these meetings are to go through the Hatchery Facility Alternative Analysis Report in detail. This includes the step-by-step review of inputs to the evaluation matrix. The meetings will be documented in meeting minutes. The goal of the meetings will be to come to an agreement on the preferred water supply alternative to carry forward into the 10% design.

This subtask includes two (2) four-hour virtual meetings. Up to 15 McMillen personnel will attend the virtual meetings.

SUBTASK 13.12 ALTERNATIVES ANALYSIS MEETING DELIVERABLES

This subtask includes the development meeting agendas for each meeting described in Subtasks 13.8 through 13.11, and meeting minutes for each meeting described in Subtasks 13.8 through 13.11.

DELIVERABLES

- DRAFT Hatchery Alternatives Meeting Agendas (Word and PDF format).
- DRAFT Hatchery Alternatives Meeting Agendas (Word and PDF format).

- FINAL Hatchery Alternatives Meeting Agendas (Word and PDF format).
- DRAFT Hatchery Alternatives Meeting Minutes (Word and PDF format).
- FINAL Hatchery Alternatives Meeting Minutes (Word and PDF format).

ASSUMPTIONS

- TPU will coordinate weighting of criteria for review and agreement prior to Workshop No. 02 to discuss criteria and weighting.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 2 Rates (2025) will be used for budgeting purposes.

TASK 14: HYDROLOGIC & HYDRAULIC ANALYSIS

The purpose of this task is to develop the Master Hydrology & Hydraulic Report and Hydraulic Grade Line & Civil 3D Model.

SUBTASK 14.1 HYDRAULIC ANALYSIS OF EXISTING FACILITY

The purpose of this subtask is to create a hydraulic model to assess the hydraulics of the existing CTH facility operations. A hydraulic grade line drawing of the existing facility hydraulics will be developed as a baseline for the project.

DELIVERABLES

- DRAFT Existing Cowlitz Trout Hatchery Hydraulic Grade Line (Auto CAD and PDF format).
- FINAL Existing Cowlitz Trout Hatchery Hydraulic Grade Line (Auto CAD and PDF format).

ASSUMPTIONS

- The hydraulic grade line will be developed using EPANet software.
- TPU review periods will be 10 business days, unless noted otherwise.
- Methods & Assumptions document will either be as part of the development of this Task or part of the Basis of Design (BOD) early in the programs Tasks to include methodology of model integration across all model types. The purpose of this document development is to assure there is no conflict between models being utilized for the total program.

SUBTASK 14.2 SITE STORMWATER DESIGN DEVELOPMENT

The purpose of this subtask is to create a hydrologic and hydraulic (HEC-RAS) model to assess the stormwater drainage of the facility to meet Department of Ecology (DOE) best management practices (BMPs) at the hatchery site. During the Groundwater Rehabilitation Study (Task 9) a

series of shallow borings/test pits will be completed to determine the infiltration potential at certain locations around the hatchery site. Upgrades are needed for the total facility for new and retrofitted impervious surfaces and upgrade to the current adopted DOE Stormwater Management Manual for Western Washington (SWMMWW) which may include detention and stormwater treatment.

DELIVERABLES

- DRAFT Stormwater Management Plan (Word and PDF format).
- FINAL Stormwater Management Plan (Word and PDF format).
- Native modeling software files.

ASSUMPTIONS

- The current adopted Stormwater Management Manual for Western Washington (SWMMWW) will be utilized for stormwater management.
- This task will utilize DOE WWHM model.
- This task includes a two-hour preliminary virtual meeting to discuss the scope of retrofitted impervious, non-pollution and polluting generating surfaces and proposed assumptions.
- The site stormwater hydraulic modeling will be developed using HECRAS software.
- The site grading will be developed using Civil3D AutoCAD software.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 3 Rates (2026) will be used for budgeting purposes.

SUBTASK 14.3 HATCHERY HYDRAULIC ANALYSIS REPORT

The facility hydraulics will be analyzed throughout each of the Project tasks. The purpose of this task is to develop a Hydraulic Design Report for the recommended alternative developed in the Water Supply Alternatives Analysis and the Hatchery Facility Alternatives Analysis. The purpose of the study is to develop the required hydraulic gradient based upon the hatchery water supply demand determined in the bioprogram as well as the preferred alternatives that will be carried out in the 10% Design. The hydraulic analysis will evaluate the surface water intake and pump station, groundwater infrastructure, the head tank, supply piping, rearing facilities, and outlet structures. The analysis will also consider/evaluate any water treatment facilities (e.g., contact basins). The Hydraulic Analysis Report will be updated on a regular basis during the performance of the engineering and design work as the design develops beyond the 10% design.

DELIVERABLES

- DRAFT 10% Design Hydraulic Analysis Report (Word and PDF format)
- FINAL 10% Design Hydraulic Analysis Report (Word and PDF format)

ASSUMPTIONS

- The hydraulic grade line will be developed using EPANet software.
- The Hydraulic Analysis Report will be developed for the preferred alternative recommended for 10% design. Hydraulic analysis of the existing system and the developed alternatives will be developed throughout the Project as described in this scope of work.
- The hydraulic analysis will include analysis of the Adult Fish Handling Facility (AFHF) that includes the site process piping into the facility and proposed outfall system.
- The hydraulic analysis will include the domestic water supply and fire protection evaluation.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 3 Rates (2026) will be used for budgeting purposes.

TASK 15: 10% DESIGN PLAN SET AND BASIS OF DESIGN MEMORANDUM

The purpose of this work task is to develop the preferred alternative, as determined by the Alternatives Analysis Report, to a 10% design level. The documents developed include 10% design drawings, a list of specifications, and a 10% Basis of Design (BOD).

Additionally, TPU has asked for McMillen to prepare memorandums that outline the potential phasing of construction to ensure hatchery operations can be maintained. Therefore, the following memorandums will be developed:

- Phasing and Constructability Technical Memorandum (Means and Methods).
- Maintaining Operations Plans and Supporting Technical Reports and Plan.
- Interim / Permanent Hydraulic Systems Summary Memorandum.
- Interim / Permanent Electrical & SCADA Summary Memorandum.
- Interim to Permanent M & E (Monitor/Evaluate) Transfer Facility (Fish Transfer) Summary Memorandum.
- Construction and Master Build Out Circulation Plan Summary Memorandum. This memorandum will summarize public traffic management and circulation to address bio-security risks at the CTH.

DELIVERABLES

- 10% Design Drawings – Compile full plan set and integrate TPU Survey deliverables for existing site conditions (Auto CADD and PDF format).
- 10% Design List of Specifications (Word and PDF format).
- 10% Basis of Design Memorandum (Word and PDF format).
- Phasing and Constructability Technical Memorandum (Means and Methods) (Word and PDF format).
- Maintaining Operations Plans and Supporting Technical Reports and Plan Sheets (Word and PDF format)
- DRAFT Interim / Permanent Hydraulic Systems Summary Memorandum (Word and PDF format).
- FINAL Interim / Permanent Hydraulic Systems Summary Memorandum (Word and PDF format).
- DRAFT Interim / Permanent Electrical & SCADA Summary Memorandum (Word and PDF format).
- FINAL Interim / Permanent Electrical & SCADA Summary Memorandum (Word and PDF format).
- Interim to Permanent M & E (Monitor/Evaluate) Transfer Facility (Fish Transfer) Summary Memorandum (Word and PDF format).
- Construction and Master Build Out Circulation Plan Summary Memorandum (Delivery/Operations/Maintenance/Staff/Visitors/Residents) (Word and PDF format).
- DRAFT 10% Design Meeting Agendas (Word and PDF format).
- FINAL 10% Design Meeting Agendas (Word and PDF format).
- DRAFT 10% Design Meeting Minutes (Word and PDF format).
- FINAL 10% Design Meeting Minutes (Word and PDF format).

ASSUMPTIONS

- The design will be to a minimum 50-year operational life.
- The 10% site civil improvement design includes civil grading plans, site restoration plans, domestic water / fire suppression piping, hatchery site process/yard piping plans, septic/drain fields, and stormwater management plans. This assumption includes discussions during the development of the basis of design if the civil elements will continue to function or if any

upgrades, maintenance, rehabilitations will be needed based on the selected alternatives impacts.

- The pervious and impervious surfaces developed from the 10% design will be used in Subtask 14.2 Site Stormwater Design Development as well as to develop the stormwater management and drainage design.
- The Consultant shall include design for all Electrical and Instrumentation required to support the changes required by the other tasks in this proposal. The Consultant shall provide a 10% design for electrical modifications, including new switchgear and emergency generator replacement, required and proposed instrumentation at each system. Tacoma Power will internally do all programming of Programmable Logic Controllers (PLCs) and Human Machine Interfaces (HMI's).
- Architectural 10% design includes Hatchery Building (assumes a 20,000-square foot (sf) single story facility once renovated and added onto or new), a new Head Tank, Storage Building (assuming 500 sf for 2 storage buildings), and hatchery living quarters upgrades limited to kitchens and windows.
- Assumes two four-hour workshops with TPU staff. One meeting to review the Interim / Permanent Hydraulic Systems Summary Memorandum and another meeting to review the Interim / Permanent Electrical & SCADA Summary Memorandum.
- Assumes one (1) eight-hour meeting at the Salmon Hatchery Facility in Salkum, WA, with discipline specific TPU subject matter experts (SMEs). The meeting assumes two (2) days of travel and one (1) full day on site at the hatchery facility (up to 8 hours). Up to eight (8) McMillen personnel and one subconsultant will attend the meeting and site visit in Salkum, WA.
- The 10% Design Drawings will include up to 75 design drawings.
- The 10% Design Workshop will include two (2) eight (8) hour workshops—one workshop will be at TPU's office, and one workshop will be at the Salmon Hatchery Visitor Center Conference room to include hybrid for staff.
- TPU review periods will be 10 business days, unless noted otherwise.
- Based upon the Project schedule, Year 3 Rates (2026) will be used for budgeting purposes.

TASK 16.0 FULL OPINION OF PROBABLE CONSTRUCTION COSTS 10% DESIGN

This task includes the development of the full opinion of probable costs based on the phased approach to finalize design and complete construction. As part of the 10% design development, McMillen will prepare detailed construction cost estimates and construction schedules. Developing an accurate cost estimate is critical to the success of the Program to ensure that the

intended financial performance is obtained from the completed project. We use the construction estimating software Heavy Bid to develop our construction cost estimates which provides a detailed breakdown of the labor, materials, equipment, and subcontractors cost associated with each construction task. An updated Program schedule (Subtask 1.4) with construction timelines will be included with our updated 10% design submittal.

DELIVERABLES

- Class 4 Opinion of Probably Construction Costs Estimate (Excel and PDF format)
- TPU Design and Construction Labor Forecast Assumptions Summary Memorandum (Word and PDF format).
- Construction Management Break Down and Forecast Assumptions (Word and PDF format).
- Specialty Inspections Costs.
- Interim Staffing Forecast Assumptions for Phasing (Word and PDF format).
- Specialty Testing Assumptions (Word and PDF format).
- Permitting Costs Assumptions (Word and PDF format).
- Water Rights Costs Assumptions (Word and PDF format).
- Risk Assessments (Word and PDF format).
 - Construction Price Indexing (CPI) for Appropriate Build Out Phasing (annual)
 - Costs incurred for interim stages and phasing.
- DRAFT 10% Cost Estimate Meeting Agendas (Word and PDF format).
- FINAL 10% Cost Estimate Meeting Agendas (Word and PDF format).
- DRAFT 10% Cost Estimate Meeting Minutes (Word and PDF format).
- FINAL 10% Cost Estimate Meeting Minutes (Word and PDF format).

ASSUMPTIONS

- A Class 4 estimate will be prepared at the 10% design level of Project definition as defined by the AACE. Typical accuracy ranges for AACE Class 4 estimates are -30% to -15% on the low side, and +20% to +50% on the high side, depending on the complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Assume 20% contingency on construction costs at 10% design.
- This subtask includes two four-hour virtual workshops to review the cost estimates and construction schedule.
- TPU review periods will be 10 business days, unless noted otherwise.

- Based upon the Project schedule, Year 3 Rates (2026) will be used for budgeting purposes.

SCHEDULE

TPU anticipates issuing a Notice to Proceed (NTP) in May 2024. See the attached anticipated Project Schedule for the Project for 2024 through 2026.

BUDGET

The budget estimate for work Tasks 1 through 16 is presented in the attached Table 1. McMillen proposes to complete the work outlined above on a time and materials basis, not to exceed a Contract total of \$6,200,000.00 consisting of an initial Authorized Budget of \$6,020,872.65 and a Management Reserve Fund (MRF) to be released in approved Task Orders for up to a not to exceed amount of \$179,127.35.

CONCLUSION

We appreciate the opportunity to provide you with a detailed SOW, time and materials cost breakdown, and schedule for execution of the Cowlitz Trout Hatchery Remodel Project. If you have any questions or need additional information, please contact Jodi Burns at (208) 342-4214. We look forward to serving TPU on this Project.

Sincerely,



Jodi Burns, PE
Senior Civil Project Manager

cc Mara McMillen, President
 Marcus Emmons, Vice President, Director of Operations



EXHIBIT A – SCOPE OF SERVICES

Table 1. Program Budget

Description	Contract Totals	MRF Optional Task Order to Authorize	Authorized Budget
Task 1: Program Management	\$ 1,265,405.00	\$ -	\$ 1,265,405.00
Task 2: TPU Partnering Charter/Kick Off	\$ 235,228.50	\$ -	\$ 235,228.50
Task 3: Data Collection	\$ 103,680.00	\$ -	\$ 103,680.00
Task 4: Environmental	\$ 55,796.00	\$ -	\$ 55,796.00
Task 5: Survey Coordination	\$ 67,436.00	\$ -	\$ 67,436.00
Task 6: Basis of Design Memorandum	\$ 69,150.00	\$ -	\$ 69,150.00
Task 7: Update Bioprogramming Report & Model	\$ 76,640.00	\$ -	\$ 76,640.00
Task 8: Ozone Treatment Facility Study	\$ 195,030.00	\$ 71,660.00	\$ 123,370.00
Task 9: Groundwater Rehabilitation Study	\$ 1,429,169.60	\$ 30,065.00	\$ 1,399,104.60
Task 10: Climate Change Study	\$ 85,838.70	\$ 22,950.00	\$ 62,888.70
Task 11: Water Supply Alternatives Analysis	\$ 646,449.35		\$ 646,449.35
Task 12: Water Rights Analysis	\$ 40,312.00	\$ 18,960.00	\$ 21,352.00
Task 13: Hatchery Facility Alternatives Analysis	\$ 989,241.40		\$ 989,241.40
Task 14: Hydrologic & Hydraulic Analysis	\$ 150,256.00		\$ 150,256.00
Task 15: 10% Design Plan Set and Basis of Design Memorandum	\$ 585,141.10		\$ 585,141.10



Description	Contract Totals	MRF Optional Task Order to Authorize	Authorized Budget
Task 16: Full Opinion of Probable Construction Costs	\$ 169,734.00		\$ 169,734.00
Management Reserve Fund (MRF) Unassigned	\$ 35,492.35	\$ 35,492.35	\$ -
Contract Total	\$ 6,200,000.00	\$ 179,127.35	\$ 6,020,872.65



EXHIBIT A – SCOPE OF SERVICES

